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AUGUST, 1885.

THEO. S. CASE, M. D.,
WARREN WATSON, EDITORS.

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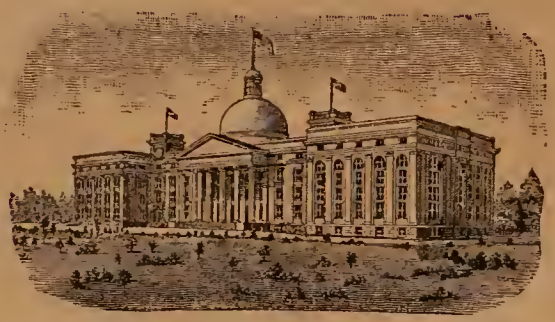

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PROSPECTUS

OF THE

KANSAS CITY REVIEW.

Kansas City, Mo., August 5th, 1885.

It is the purpose of the undersigned to continue the publication of the Kansas City Review of Science and Industry under the name of the KANSAS CITY REVIEW. It must not be supposed that we contemplate any material change in the character of the REVIEW by thus curtailing its name—on the contrary it will continue in the course pursued by its founder—but several new features will be added to those heretofore belonging to it, which experience seems to dictate will be of interest and utility to its readers. Among the new features contemplated will be a department devoted to Essays and Reviews, and space will be set apart for Correspondence and Queries. Other additions may be made in the future if necessary to give the REVIEW a wider and more popular acceptation.

It is hoped that the former patronage extended to the REVIEW will not suffer by reason of the interval between the last and the present numbers. In making the proper arrangements for continuing its publication under new auspices an interval of suspension was unavoidable. We feel confident that, under the present management, the people of Kansas City and vicinity will find the REVIEW a worthy object for encouragement and patronage. Our present subscription list is quite large and includes the most thoughtful, enlightened and progressive inhabitants of Missouri, Kansas, Colorado and other neighboring States; hence the REVIEW will not only be a valuable medium of communication for those who have scientific or other discoveries and theories to advance, but also desirable as an advertising medium. It is the policy of the present management to present the claims of advertisers in a conspicuous and attractive manner and thus place the REVIEW abreast of more pretentious periodicals in this respect.

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The price of subscription will continue at $2.50 per annum. But for Volume IX, which will contain only the August, September, October, November and December numbers the subscription price will be only $1.00. Patrons will only be asked to subscribe till January first at present.

T. S. CASE, M. D., }
WARREN WATSON, } Editors.

JAS. E. PAYNE, Publisher.

THE KANSAS CITY REVIEW,

DEVOTED TO

Science, Art, Indusrty and Literature,

VOL. IX. AUGUST 1885. NO. 1.

THE RELATIONS OF ARCHÆOLOGY TO HISTORY.

Archæology, as far as its scope has been in any way defined, stands midway between paleontology and history, and seems to encroach somewhat upon the territory of both. The relation it bears to history seems to consist in matters of interpretation. The highest conception we can form of history is, that it should be science; something that we can conjure by, something that we can prophesy by. And science is the exact co-ordination of the human brain to the phenomena that surround us. We may give the same definition to knowledge, since all knowledge in its last analysis is the same, although the subjects of knowledge may be different. If history is to be looked upon as a series of annals, recording the wars of different people or the exploits of different chieftains, archæology has very little significance. If we could get possession of Arthur's sword, Excalibur, or the horn that summoned Charlemagne back to the slaughter of Roncesvalles, we could not write the annals fuller than they are. If, however, we look upon history as a branch of physiology, archæology acquires an importance that cannot be overestimated. And how is history a branch of physiology? Physiology takes up the history of the different organs of the human body, shows what their functions are singly, then what their effects upon each other are when acting together as the perfect man. There it leaves him. But beyond this, man's life goes on in the same physiological line. As every one of the different organs of the body is a unit helping to form the mass, so every individual becomes a unit, or molecule, helping to form the mass of society. In this position he is held by laws of cohesion, and laws of growth which affect the whole mass; so that the nation must

be looked upon as an organism, or a tissue, with a general vitality which animates it. Say what we like about mind and vital force, they appear before us in all their phases, as resulting from a physical basis, and through this physical part of them they are able by some subtle chemistry to draw further power of their kind from nutrition. When we reflect that the varying moods of the most spiritual mind, its exaltation or depression, its stupidity and its clearness, are the results, all through life, of this process of nutrition, it must become manifest to us that some material law here directly impinges upon the spiritual. In no position, however, to the superficial observer, does man appear so much a free agent, so much a law to himself, as when acting in connection with other men. When a person of very great energy arises and seems to dominate and direct his age, it is with difficulty that we can credit the fact that he is only the exponent of his time. We believe almost in spite of ourselves, that the volcano makes the eruption instead of that the eruption builds the volcano. No one man is particularly necessary to the age in which he lives, but the age is particularly necessary to the man. The reformation made Luther; the revolution of '93 made Napoleon. A hundred years either before or after would have made them different men. Luther might have been a fanatic, burned at the stake for his honesty and plain speaking; Napoleon might have become an outlaw hunted by the troops of the grand monarch in the mountains of Southern France. The time demands an expression, and the man is pushed ahead and converted into a hieroglyph. It is nature's writing. The hieroglyph is nothing, but it symbolizes everything.

These crises which drag the individual into prominence usually mark some disturbance which interferes with the nation's growth and development. If we could imagine several communities of men, each born and reared under the same conditions, exposed to the same atmosphere and living on the same soil, their histories would be the same. With a little more knowledge of disturbing causes, even the history of the nations of to-day might be written impersonally. This is certainly all that can be asked of history in the highest sense of the term. To mark out the ideal line of progress under given conditions, to approximate to the reasons of variation in any particular nation, this is all that we can expect. More than this must be given over to the annalist and the antiquary, and really we do not lose much by doing this. We can learn more of humanity from the novel of to-day than from all the annals of ancient Rome, and, apart from the curiosity we might have, it would benefit us more to be introduced to the living chieftains of the Zunis than to all the Pharaohs whose mummies have been unearthed.

For convenience the process of national development has been divided

into stages. We have the savage, the barbarous, the civilized nations, etc. It is needless to numerate all the degrees of enlightenment given by ethnologists. To a certain extent they all seem to me unphilosophical, inasmuch as they start simply from a comparative basis. Not much better it seems to me is the division into stone, bronze and iron ages, yet it is almost necessary to have some terms by which to designate the different stages of development. The division is rendered especially difficult from the fact that nations like individuals have their special lines of adaptation. The English are especially adapted to trade and manufactures; the Germans to patient, laborious, scientific investigation. Yet we cannot say that one of them is further along on the road of civilization than the other. Why do we think that Americans are further advanced than other nations? Simply because we have invented many labor-saving machines, and have developed the resources of a continent in a wonderfully short time. Yet other nations think as well as we do and form for themselves fully as lofty ideals. I am not certain that triumph over nature in the way we have achieved it, is always an advantage, for the multitude of servants is not always an index of the elevation of the master. The tremendous physical forces which a single man now summons to his aid may threaten us with a speedy return to barbarism, for certainly the morals of a railroad corporation are no improvement on those of Confucius. The Brahmin, whose metaphysics and philosophy were old when Greece was young, is fully a match for the Western missionary who takes with him the newest theology, and the latest scheme for reconciling science and divinity.

Comparisons like these might be made indefinitely and in the end they would be unsatisfactory. The only thing to do then is to take the brain as the map of the man or nation, and apply the process of exhaustion. In regard to any nation let us ask how far the potential activities of brain power have been exerted. So far as known man is the burning point in which the rays of vital force meet and focus. He is not exactly a microcosm, or epitome of the world, but he is a centre from which the world re-acts upon itself. All his activities are in a way reflections, responses to irritations from outside things. These irritations are responded to by work, and work of all kinds marks itself upon the face of the world. A nation passes over a land like a glacier and when it disappears it leaves its moraines in every direction. A country long inhabited by a civilized people has a different appearance from one just settled for a hundred years or so. It acquires a domesticated look, like that of a wild animal that has been tamed. The sharp angles of the landscape melt gradually into graceful curves, the people and the country seem to grow nearer to each other as if they mutually made concessions, the farm

houses and villages nestle into the land as if they naturally belonged there. This subtle harmony of long habitation and mutual understanding is one of the first things to observe in visiting Europe. Man does not seem there like an interloper, like a hostile power come to do violence, as in many places here; even the grey ruins perched upon cliffs have their rough angles veiled with vines and mosses, as if nature, like a mother, were desirous of screening from view the deformities of the child she nursed. In this nearness of communion, there seems to be no reason why the race should not live on and on until the end. But what is the end? There is no law of limitation with man except his capacity to take; there is no limitation to nature except her capacity to give. There is every reason to suppose that the highest development of man is capable of exhausting all the means the earth can offer for his support. Whether man has yet reached the maximum of his powers in any one instance, whether the crowning nation of the earth has yet arisen may be matter for question. Up to this time nations have died by assassination and their blood has but enriched the earth, but already we begin to see that the track of the Anglo-Saxon is more destructive than a conflagration. Should the English die out from England in the natural way the island will be left behind like a rubbish heap in the sea. The coal, the iron, the tin will be exhausted, and a few half savage fishermen will spread their nets over shell heaps where the Thames now wanders to the mists of the German ocean.

Now what relation can archæology bear to history written in accordance with the ideal I have sketched? There can be only one answer. It is the geology of history; it furnishes facts for history to interpret. It holds up a bushel of arrow heads; they are nature's cuneiform inscriptions. It shows a lap full of broken pottery, covered with fanciful designs, twisted into outlandish shapes. These are the broken symbols of ancient ideas, the speechless records showing that a peculiar kind of man lived and worked. It has been said with more of epigram than wisdom, that barbarous nations have no history. In the sense of written annals perhaps they have none. In another sense they have one more important because it contradicts the annals. From the structure of our intellects we are obliged today to confront every fact with a question. It is an inspired curiosity arising from the necessities of our nature, and the first question asked at the commencement assails us now as then. That question is, Whence? The answer of the annalist was an inscription which closed the door of thought by saying that man at no remote period descended from the gods. The answer of archæology to this question is an arrow head dug from beneath the alluvium, or the picture of a reindeer drawn upon the half rotten tusk of a mammoth. Of course I have not time in this short essay to go

into the question of interpreting the facts. I think we have not yet the means at hand to do this conclusively in all instances. There is some show of truth in the argument that opportunity must figure largely in the instruments that a man must use to attain his ends. If he live in a country full of metals, where the conditions foster civilization, and yet has only bone implements and arrows, tipped with flint, he must indeed be a savage. If he live in a rough barren country where there are no metals, and use the same weapons he may be yet far removed from savagery. Such a man we can imagine chanting sublime poetry round his camp fire at night, or talking in terms of a deep philosophy. Not much can be argued, however, from the uncertainty of the record, for it certainly is no more untrustworthy than the annals which Niebuhr discarded when he re-wrote the history of Ancient Rome. As regards the archæology of recent times there is nothing more to say. Herculaneum, Pompeii, the roads, the aqueducts, the paintings on the walls of Karnak, the sculptures in the palaces of Sargon—these are fossils which introduce us almost as closely to the times as eye witnesses could do. What they have been to history any one knows who has seen how history has been re-written, during the last quarter of a century. It is not so much the heroes who have suffered. We have not dethroned Sesostris or Nebuchadnezzar, but we know more how the common people lived, how they bought and sold, how firmly the foot of the monarch was planted upon the neck of the people.

INTELLECTUAL LOVE.

"Love, love, what is love?" is the inquisitive refrain of a familiar ditty; but the only answer it gives to the old, old riddle is—"Love is what makes a man feel so peculiar." Doubtless most of us can heartily testify to the truth of this statement; yet do we approach any nearer to the arcanum where Love resides through our peculiar emotional experiences? Can such answers, whether dictated by gravity or gaiety, put aside the enquiry into the nature and source of Love? Our experiences are only mysterious shadows on the mirror of life. We watch them, like the Lady of Sharlott, as they pass and repass, with no power to do otherwise though the key to their origin seems near by. To those who are satisfied with a physical explanation for every phenomenon of life, who tell us with consequential dogmatism that the material world contains all the potencies that can possibly operate on consciousness, these shadows have no deeper significance than the ripple marks of a wave on the ocean beach—exposed to the eroding contact of the next wave or to be hidden under the shifting sands. To

such philosophers the admonition of Emerson is addressed: "Let us be silent that we may hear the whispers of the gods."

It is indeed difficult to define Love. La Rochefoucauld expressed the general opinion in his definition. "All we can say," he asserts, "is that in the soul it is a desire to rule, in the mind it is a sympathy and in the body it is a hidden and delicate wish to possess what we love—plus many mysteries." But this definition, adopted even by lexicographers, leaves a world of occult, yet potential, motivities to be apprehended only through the flippant words "plus many mysteries." It is these very mysteries which need definition and which have attracted from time immemorial the highest flights of the human intellect in endeavors to make manifest to man. Beyond these "many mysteries" the definition comprises little of the characteristics of the passion besides its sensual incidents, and it is doubted whether any of these incidents are really related to love. In truth there has always existed a school of perfectionists which holds that the sexual instinct, as well as all other purely selfish passions are antithetical to the genuine emotion of love, and are clogs and obstacles to its free and noble course. They claim that the essence of love is purity, and that breathe one unhallowed breath upon its flame

"And it is gone forever, and but leaves
A sullied vase—its pure light lost in shame."

This school scornfully denies that that passion or instinct in man and beast which is the most prolific source of cruelty and selfish brutality is in any way related to the holy passion.

In its creed "love is the great instrument of nature, the bond and cement of society, the spirit and springs of the universe." From its view the ancient myth which makes Love the primeval father of gods and men as well as the source from which emenated the perceptible universe, is no idle tale. And it cannot be doubted that behind this antique teleological conception there lies an irrepressible and universal idea,—an idea that the perceptible universe manifestly imperceptible in itself, is yet, for us, given form and substance, given all the attributes by which it may be apprehended, by some such harmonizing influence as an all-pervading Love: in the absence of which the sensuous world would fleet into nothingness like a mirage of the desert. The content of his idea is not peculiar to antiquity nor is it confined to one race or one civilization. It is the acna or akasa of eastern rhapsodists; it is the astral light of the alchemists and theosophists; it is the psychismic fluid of Quesne; it is the psychic force of Crookes and Varley; it was no more the underlying spirit of the widespread ancient mysteries than the *Deus ex machina* of many speculative systems. Thus DesCartes posits a divine uncreated substance as the mediator between

mind and matter, and Leibnitz must needs call in the assistance of a pre-established harmony to bring his monads into orderly connection. Hence it will be seen that the many mysteries of Love cover an illimitable field,—a field full of fair blossoms and untasted fruit, whose full harvest we must despair of garnering and be content to bear away a handful of its wealth as evidence that we have discovered the hidden territory.

It is with one expression alone of this universal intuition that we have to do; the old, old doctrine that an all-pervading essence establishes affinities among psychological units just as it does among physical elements. Not that all individuals are affected alike; though this universally diffused essence may animate equally all living beings yet it may be hampered in its influence by the incidents of disposition and habit. Some are brought together so powerfully that, though continents and oceans intervene, nothing can keep them apart; others so feebly that living in the same village and jostling each other every day, they live and die but dimly conscious of each other's existence. It is even contended that the gods and goddesses themselves have been created only to furnish lofty objects upon which to lavish a mystic passion whose real object belongs to real life though undiscovered and perhaps undiscoverable. Nay, there are those who insist that a real object is unessential to love; that the true lover

> "Is in love with an ideal,
> A creature of his own imagination,
> A child of air, an echo of the heart."

There have been many notable examples of this beatific passion and many noble expressions of it in literature. The stories of Petrarch and Laura, Dante and Beatrice, rise at once into recollection as expressions of a purely intellectual passion which make the heart ask itself a thousand questions more inscrutable than the riddle of the Sphynx. That Laura was a real woman, and married at that, there is no room to doubt. That she treated Petrarch with distant courtesy and that they enjoyed no intimacy are facts which cannot be well gainsaid. Yet for twenty-one years during her life, the poet celebrated his ideal passion in a series of sonnets which have immortalized both; and after her death the passion lingered in Petrarch's bosom, more tranquil and calm, more grave and tender, but not less strong than when Laura lived to inspire him with her presence. After she had passed into the ideal world, the paradise of the god whose name is Love, the poet pictured her as waiting for him there full of pity and tenderness and offering an eternity of love in recompense for his constancy. Now was this over-mastering passion a mere sentiment, a fantastic or morbid impulse, a whimsical expression of the sexual instinct, or was it dictated by the adoration of an ideal affinity personified in Laura,—an affinity

which would perhaps have taken flight at the approach of sensual desire? I believe that the coarsest natures, even, derive more genuine pleasure from the pursuit of desire than in its gratification. There is ever flitting before us a phantom pleasure, and in our anxiety to clasp it we are led to satisfy ourselves with the basest of counterfeits. And then we cry out against love as though our miserable gratifications were the genuine raptures we had sought. I believe also that if Petrarch and Laura had been brought together under circumstances more encouraging to the gratification of sexual instinct, the beatific emotion would have departed, shamed from the poet's heart.

"What is Love? 'tis not the kiss
Of a harlot-lip—the bliss
That doth perish
While we cherish
The fleeting charm; and what so fleet as this?"

There is a passage in the Confessions of Rousseau, startling in its candor and unconventionalism, that describes the destruction of such an ideal by its merger with sensual gratification. Madame de Warrens, whom he had adored without stain of desire, unexpectedly offered him the last favors of love; but even as he clasped her in his arms a revulsion of feeling came over him, his ideal passion fled away forever and he deluged her bosom with his tears. Owen Meredith expressed more poetically the same feeling in his little poem entitled Possession:

A poet loved a star,
And to it whispered nightly,
"Being so fair, why art thou love so far?
Or why so coldly shine who shinest so brightly?
O Beauty woo'd and unpossessed,
O might I to this beating breast
But clasp thee once and then die blest."

That star her poet's love,
So wildly warm, made human.
And leaving for his sake her heaven above,
His star stoop'd earthward and became a woman.
"Thou who hast woo'd and hast possessed,
My lover, answer, which was best,
The star's beam, or the woman's breast?"

"I miss from heaven," the man replied,
"A light that drew my spirit to it."
And to the man the woman sigh'd,
"I miss from earth a poet."

In the Vita Nuova and the Paradise of Dante, we find another expression of the purely intellectual passion. The girl of sixteen, whom Dante

had vainly loved, inspired him with an ideal yearning which survived marriage and paternity and grew stronger and purer in the midst of adversity and the approach of age. She became apotheosized in his thoughts but personified not so much the attributes of Cytherea as those of the Virgin Mary. Plato had taught that love is an initiation into the secrets of the spiritual world and Dante rediscovered this teaching and gave it to us in a comprehensible form. In the Divine Comedy his own inspired genius, personified by Virgil, suffices to conduct him safely through the horrors and jeopardies of retributive justice, but it is love alone, in the form of Beatrice, that can guide him into Paradise.

This Platonic idea has received expression from an oriental source: The Song of Govind translated from the Sanscrit by Edwin Arnold, is a little pastoral drama, in which, under the form of Krishna, the human soul is displayed struggling between the opposing powers of intellectual or spiritual love and sensuality. Radha, the genius of spiritual love, discovering Krishna in a forest dallying with wanton shepherdesses (personifications of sensuality), listening to their music and laughter and succumbing to their voluptous temptations, determines to rescue him from the shame and folly of such a life. She glides into the group of voluptuaries and

"Touched Krishna with a soft mouth, kind and cool."

Though she comes to him as a vision and not as flesh and blood, yet her presence as the ideal of his heart, causes him to forsake the gay partners of his pleasures and seek for Radha and grieve with self-contempt over his follies. In the delicacy of his portraiture the Indian poet has seized upon the unselfish character of spiritual love. Though Rhada fears that her efforts are unavailing for the time, yet she does not condemn Krishna; she says:

"He shall be left wholly to his choice,
Free for his pleasant sin,
With the golden-girdled damsels
Of the bowers I found him in."

She knows that at last he will return and once tasting the superior joys of the love she offers will never again be satisfied with mere sensuous gratifications. He does come at length and, having repented bitterly, the sinful human soul is forgiven and is united to Radha, and in that union finds no bliss lacking that could be desired.

But there is perhaps no truer expression of this ecstatic passion than in Shelley's Epipsychidion. The Emilia of his poem was a mere woman; yet the exaltation of sentiment with which he addresses her surpasses the idealism of Petrarch and the ecstacy of Dante. She becomes under his inspira-

tion a western Radha. While you read his enthusiastic and glowing lines it is easy to forget that the object of his adoration is a mortal. She becomes a goddess—a Greek divinity worshipped with all the gentle flattery and fervor that humanity ever bestows upon its female gods. Every verse is a cry, every sentence a prayer. He speaks of that ideal shape which the fancy creates and presents to the soul as the only true embodiment of love; of his rash search "in many mortal forms" for the shadow of that idol of his thought; of the fair, the wise and the true, who passed before him, and, at length, of his discovery in Emilia of the affinity which his soul had for so long time pursued. And then wreathing together a wilderness of quaint conceits into a chaplet for his Lady Fair,—expressing the very language of love in a torrent of passionate words, and describing the Paradise that awaits them, he tells her that there

> "We shall become the same, we shall be one
> Spirit within two frames. Oh! wherefore two?
> One passion in twin hearts, which grows and grew,
> Till, like two meteors of expanding flame,
> Those spheres, instinct with it, become the same,
> Touch, mingle, are transfigured; ever still
> Burning yet ever still inconsumable.
> * * * * * * * *
> One hope within two wills; one life, one death,
> One heaven, one hell, one immortality,
> And one annihilation."

Now what think you of this refined passion which, for want of a better name has been called intellectual Love? Shall we be content to regard it as a mere sentimentality? Or is there a genuine motive beneath its unselfish promptings, its rhapsodical and romantic philosophy, its lofty ideals and inspirations? Are these simply refinements of that incentive throughout animated nature which attends upon the propagation of life? Or is there a "Celestial Harmony," such as old Spencer imagined, independent of every material or sensual spur, which pervades our beings and arouses the "longings infinite" of intellectual love? For myself I am inclined to say with the Bard of Abbotsford:

> "It is not Fantasy's hot fire,
> Whose wishes, soon as granted, fly;
> It liveth not in fierce Desire,
> With dead Desire it cannot die;
> It is the secret sympathy,
> The silver link, the silken tie,
> Which heart to heart and mind to mind
> In body and in soul can bind."

THE INDUSTRIAL ACHIEVEMENTS OF THE ANCIENTS.

It is common for us to magnify the creations of modern genius and to look upon them as *sui generis*, the first of their kind. The steam-engine, the telegraph, the power-loom, the iron ships and bridges, the instruments of science and industry, surely had no prototypes in the ancient world! Even while we admit engineering and architectural skill to the Mesopotamians and Egyptians, we feel that, after all, these people were barbarous compared to modern civilized man; and our admiration consists chiefly of wonder that such marvelous feats were achieved by such immature efforts. The pyramids are stupendous, certainly, but how useless! The barbarism of their builders could not be better shown than by a comparison of the value placed on human labor then and now. Would thousands of human beings be employed now in the silly labor of building a King's tomb? Hundreds of thousands of men, but a few years ago, followed the beck of a Napoleon to perform achievements quite as great and far more senseless and cruel.

But there is much to be said in behalf of ancient industrial knowledge. From whence came nearly all of our common and necessary vegetable foods and most of our domesticated animals? So anciently were these familiarized to man that no one felt sufficient curiosity to explore their origins; and no record has been left of the time or place the first uncultivated plant, or the first wild animal, became tributary to human necessities and pleasures. Surely the first man who discovered the uses of the horse and tamed this noble animal to pull his chariot, or bear him to the chase, was as great a benefactor to mankind as Watts or Stephenson; yet the most ancient chronicles are silent about him. The grains of wheat found entombed with Egyptian Mummies, and in the funeral vases of Babylonia, or amongst the debris of lacustrine villages in Switzerland, are essentially the same as those sown by the farmers of to-day; and yet no observer of ancient or modern times has ever discovered this grain growing in a wild state. It might be thought that maize, so lately made known to Europeans, can show a definite origin; but so old is this valuable grain to the use of man that nowhere, over the vast domain of America, has a wild species been discovered. Some time in the remote and unchronicled past, a benefactor of his race saw the feathery tassels and glossy blades of a new plant rise amidst the foliage of a sedgy river bank, and under his intelligent care this became the maize of commerce; yet not even tradition preserves his name except in unintelligible myths. The same might be said of many of the most important products of the soil. Among fruits, the peach—in whose name its ancient home is traced—is older than the oldest historian. The banana, alike in America and the old world, can only be propagated

by cuttings; artificial propagation, through long lapse of time, has made it destitute of seeds and the plant from which it sprang has disappeared from the spontaneous vegetation of the world. In all the wide range of human foods, derived from either the fields, the orchards, or the pastures, the few which are not heritages of a past that is in no man's memory and remains unchronicled in books are of insignificant importance to the world.

But it is not alone the *products* of agriculture that we must credit to prehistoric sagacity and prevision; the art of *cultivating* them was known and practiced to a marvellous degree among the most diverse nations. The Chinese, the Mesopotamians, the Egyptians, the inhabitants of India, even the Aztecs of Mexico, had discovered, or inherited from still more ancient peoples, many of the secrets and methods of the modern farmer. Painted on the temples along the Nile, we can see representations of Egyptian farmers, plowing their fields, sowing, reaping, threshing and grinding grain,—all with a skill most unmistakable. As the horse, the ox, the sheep, the goat, the dog and the cat came to us completely civilized from prehistoric times, so did the methods and the products of agriculture. It is even contended that the ancient Ganls invented a reaping machine on wheels, with which they reaped their grain. In China our threshing-machine was anticipated, and even the claims we make for the invention of the mold-board plow is endangered by some figures in the wall sculptures of the east.

The nses of domesticated animals seem very apparent to us now, but a little reflection would show that the sight of wild herds and flocks will not necessarily suggest these uses to one who has never heard of them. The fact, then, that the use of cow's milk, for instance, is of such remote commencement that one of the nearest and dearest family relations among Aryan nations, is named from it (the word daughter orginally meant "the milker,") goes far to show the antiquity of bovine domestication. In Egypt the modern incubator was anticipated as early as the days of Menes, and the epicures of that day were equally as well served in this respect as those of the nineteenth century.

Who invented weaving? Who first discovered that the flossy coat of the sheep, the wings of the cotton-plant seed, the fibers of a tough weed, the sorcophagus of an insect, could be wrought into garments more comfortable than the foul and cumbrous skins of beasts? Myth and fable may be valuable enough but the true history of these discoveries remains as inscrutable as the history of the alphabet. Three-thousand years before Christ the Chinese and Indian annals tell of the manufactnre of silken fabrics; and the monumental remains on the Euphrates and the Nile show the weaving and use of various kinds of cloth from animal and vegetable tis-

sues. Even in the yet mysterious mounds that are encountered on every river-course in the Mississippi Valley, the weaver has left the record of his skill. The potter, too, was an adept in his art ages before Alexander crossed the Hellespont; and along with his skill and intelligence belonged an artistic excellence not accorded to his modern successors. In China and Japan, where civilization, such as it is, has been continuous for ages, the art of the past is the despair of the present. They cannot now produce the pottery which the ancient masters fabricated. The merest tyro knows that the metallurgical skill of the ancients has not been surpassed, even with the newly found appliances of modern times. Indeed there were some combinations of metals, useful as well as ornamental, like electrum and the hardened copper used by sculptors and stone-cutters, which we have lost the secret of making. The bricks and tiles of Egypt and Mesopotamia, after ages of exposure to the elements, testify to the skill and intelligence of their makers; and the cement with which they decorated or protected their pyramids, temples and palaces, is as enduring as granite. The mechanics of Babylon and Thebes, of China and Tyre, could achieve from proper materials the same results as modern artizans. In Cyprus and Asia Minor, in every seat of ancient culture, explorers have brought to light, from sepulchers and ruins, specimens of ancient skill in the manufacture of household implements and ornaments, quite as finely, and far more artistically wrought than similar products of our day. It would be useless to refer to the manufacture of arms and armour, of leather, of the thousand necessary conveniences of life. Glass is found in tombs three-thousand years old and in forms and fabrics unequalled by contemporary labor.

We boast of modern feats, of the Mont Cenis tunnel, of the Suez canal, of the Pacific rail-roads, of the Brooklyn bridge; can the ancients claim anything to compare with these? Laying aside the pyramids, whose gigantic blocks of granite were conveyed from the quarry over two-hundred miles down the Nile, even then there is little left to vaunt ourselves about. Amenemhat, an ancient Pharaoh, saw what a benefit it would be to agriculture if the surplus over-flow of the Nile could be stored for future use and prevented from flowing into the sea; so he excavated a lake, fourteen miles in length, eleven in width, from which the vivifying waters were distributed along irrigating ditches to the farmers. Rameses the Great anticipated de Lesseps, by constructing a canal which connected the Red Sea with the Mediterranean, and this canal was greatly enlarged by Necho. Nitocris built a bridge over the Euphrates at Babylon, and, instead of sending laborers to the bottom of the river, in dark caissons to scratch up puny handfuls of sand, he diverted the great river from its course, like a

god, and, when his bridge was finished, permitted it to return to its natural channel. In Peru, China and India there were aqueducts aqual in length, and the engineering skill employed, to any now extant; while the great wall of China and the roads of Peru equal anything the present age has produced.

Who was the ingenious inventor that first adpated the properties of the magnet to the use of those who go down to the sea in ships? History relates that Gama first learned of the compass from Mohammedan pirates whom he encountered at the Cape of Good Hope. Where did they get their knowledge? They must have inherited it from navigators who preceded them on the Middle sea. Indeed it is affirmed that the Phœnicians used a form of the compass (made by placing a small load-stone on one arm of a cross of straw or reeds afloat in a cup of water.) in their voyages. On the prows of Phœnician vessels stood a figure of Ashtaroth, the cross in one hand and the other extended to point the way. An ancient Chinese monarch caused figures to be placed in the front of his chariots which always pointed south. Hercules sailed at night with the help of the cup of the Sun and Abaris, the Hyperborean, was enabled, by the arrow of Pythagoras, to find his way back to the north. And what voyages these ancients performed! A Carthaginian crew sailed westward to a land beyond the Pillars of Hercules and told of the cities and wealth they saw there. Ages before the vaunted feat of Vasco de Gama, old Pharaoh Necho sent his galley through the Pillars of Hercules to circumnavigate Africa and saw them return through the Red Sea. Indeed these ancients were not stay-at-homes; their fleets whitened every sea from the Spice Islands of the East to Iceland, and, perhaps, America. And Great Easterns were not lacking in those days either. Archimedes, of Syracuse, built a ship for Hiero which consumed the materials of fifty ordinary galleys and contained temples, theatres, gardens, stables etc., of ample proportions.

Indeed there is nothing new under the sun. Every invention has grown out of the necessities of the age, not from the spontaneous genius of man. Hero of Alexandria, the inventor of the principle of the steam-engine, or, at least, the earliest to record it, might, and probably would, have developed the invention, had the time demanded it. Whether the wires with which Cleopatra conveyed intelligence were operated by electricity or not, they would have been if society had needed the discovery. Among the ancient mound-builders there was a perfect system of signal telegraphy made necessary by the continuous and savage hostility of the wild tribes of the woods. We have these ultimate products of invention because the time demanded them; but the principles underlying them were known when the oldest Pharaoh was a child; and our knowledge of the skill and

intelligence of the ancients justifies the assertion that if these inventions should have become necessary to society, as then constituted, they would have employed these principles in much the same way that our century has employed them.

THE PRIMITIVE GODS.

A purely descriptive treatment of the primeval gods would alone be very interesting. It would lead us into a world of poetry and tragedy and would be full, not alone of beauty but of significance; as showing the workings of the human intellect under circumstances widely different from ours.

Such an attempt would be too ambitious for the purposes of a single reading since it would take us at once into a wide field of myth upon which many learned volumes have been written and many more will be. Our more modest task is a brief inquiry into the principles upon which the formation of mythology proceeded and perhaps into the natural classification of the gods of antiquity.

The notion of god in the human mind, it seems quite certain, came after considerations of animal wants and after some advancement in the methods of satisfying them. Indeed if we may believe the reports of some travelers, there are people still existing who have no idea of a god, no word in their language expresses the thought of a superior invisible intelligence. The mode of genesis of the idea of invisible beings is, of course, wholly within the field of speculation. It seems most reasonable however, and probably most scholars are now agreed, that it is a gradual developement arising, in the first place, from the notion of doubles of living men; and this from the phenomena of dreams. The dreams of the primeval man, subject as he was to sudden and extreme changes of physical conditions, must have been many and vivid. The chase was again gone over, long journeys traversed and distant people seen.

Considering that the body had not moved there must have been another self, wandering about at will during sleep. Death was but a longer sleep, during which, the double of the sleeper might well be supposed to wander about with increased power of working harm on account of his invisibility. That primeval people did not suppose death to terminate the existence of the individual seems to be well attested and is inherently probable from the fact that a child (which is the purest example of an undeveloped mind,) can hardly be made to understand the significance of death. This process continued would soon people another world with invisibles who went about among their former companions intent on good and evil. To a man engaged for the most part in war and the chase they would make valuable

friends or formidable enemies and straightway no opportunity should be lost in propitiating by gifts most acceptable. Those who had been most powerful and celebrated in life, the imagination once free from modification by any evidence of the senses, soon clothed with power to triumph for a longer period over spiritual death a nd finally among some peoples, as the Greeks and Romans, they were supposed to be immortal. Thus we have reached a primeval conception of a god by what is called the Ghost theory, which is so well known that it was probably unnessary to repeat it except for symmetry. But it is probably going too far to say that all the primeval gods, or even a majority of them were supposed at one time to have lived upon the earth; although this was undoubtedly the case with the primeval gods of Greece and Rome. The gods of the Egyptians, Indians and Norseman, or a part of them, were *sui generis*, and their origin can be accounted for quite as clearly as by the Ghost theory, by considering a mental characteristic common to men in all conditions. It is alluded to in the following language by Hume: "There is a universal tendency among mankind to conceive all things like themselves, and to transfer to every object those qualities with which they are familiarly acquainted and of which they are intimately conscious. We find human faces in the moon, armies in the clouds; and, by a natural propensity, if not corrected by experience and reflection, ascribe malice or goodwill to every thing that hurts or pleases us."

The primeval man lived much nearer to the heart of nature than we, and was well nigh helpless in the grasp of her forces. Philosophy or science he had none. His wants being imperative and constant, every aspect of nature was seen in a purely personal relation to himself. Sickness and health, want and plenty, were distributed by causes unknown. Hence, it was natural that he should see a demon in every adverse, and an angel in every beneficient manifestation of nature that might well be too exaggerated ever to have been a mere human being. So strong is the tendency of man to personify purely natural phenomena, that the most highly developed of the species at this time, with all the assistance of modern philosophy is unable to free himself from it. Who has not cast a look of withering resentment at the grape-vine that tripped him: or heard the demoniacal laugh and seen the defiant look in the torrent that swept away the bridge and barred his progress? And in scientific fact we cannot conceive of a force except in terms of muscular effort. Indeed if we should finally rid ourselves of this characteristic the finest poems in literature would be prose.

The sun, the moon, the sky—stars—winds—rivers—trees—the most imposing aspects of nature were therefore either the very persons or the residence, and peculiar charges of the primeval gods, whatever of their origin,

among all peoples and we should expect in advance, what mythology affirms, that the character of these deities varied according to the impression, of different soils, climate and surface configuration in different lands.

Thus a principal Egyptian Deity is Ra or Phra, who represents the scorching hot and flashing mid-day sun of that southern country. He is all-powerful and symbolizes majesty. Their rulers were named after him. Contrast with this, Baldur, the sun god of the frozen North. Baldur, the beautiful, the fair Baldur. Baldur leaves heaven to tread the ways of men and his coming is heralded by Spring time. The sun god is neither powerful nor majestic in that country, but soft and beautiful; and it was in search of him that the Northern hordes poured over Southern Europe.

Thor, as the thunder god amongst the cliffs of Norway, is as "tall as a mountain—his beard is briars, and he rushes to his deeds with strength and frenzy." On the flats of Denmark he wanders along the shore a youth with "golden hair and downy beard." The principal gods of the Southern countries are sun gods, Osiris and Horus; of Chaldea, sky gods; of the north, wind and tempest like Odin. The gods of Greece are immortal. Nature is never frost-locked and dead. They go on forever lightly enjoying life under bright skies. Playing the flute, drinking the juice of the grape or patronizing the fine arts, their mythology is a poem.

With the northern gods life is serious. They are in one continuous combat with the fates, and finally after performing Herculean labors they fall in a desperate and bloody battle. Their mythology is a tragedy. The beautiful Baldur is slain, and even Thor succumbs after a desperate fight with the old woman, Time. There nature constantly reminded them of death, desolation, suffering and harsh battles. Thus we might proceed almost *ad infinitum* to illustrate the plan of the formation of those mythologies which later became so elaborate and intricate.

As we should know, the primeval gods are *ex necessitate*, not creators, as they became in later times; they are simply created finite beings—peculiarly powerful men and women; moreover they are generally inimical to men, for in primeval times to be a stranger was to be an enemy.

It was just as true in primeval times as now that gods are only the flattering image of the men whose gods they are. They are seen as the rain-bow; no two men see the same one.

Whoever has a fair conception of primeval man has a correct notion of the primeval gods. They were not creators with perhaps an exception. The intellects of that time were not sufficiently excursive to speculate about the origin of things. There was no work of that kind to be done and hence, no such labors were imposed on the gods. The gods themselves were too busily engaged in sleeping, eating and fighting to trouble themselves about cosmogony.

There is another element beside the aspects of nature which is potent in determining the classifications of the primeval gods. There are in the human mind two tendencies; one to idolize the deity, to press his attributes up to the farthest limit of thought—a continuing elimination of unworthy attributes—a tendency most perfectly represented by Spencer at this time. But in this process we gradually make God such a far-away being, so majestic and misty and inconceivable, that he is cut off from all sympathy with man or interest or knowledge in his affairs. He is in fact, completely deanthropomorphised. When trouble comes and the burden and heat of the day, man needs a sympathizer and helper, and his god is forthwith brought down to a level of appreciation. These two tendencies exist in all men, and one or the other predominates, according to the temperament, and they mark the distinctions between Religion and Myology, and later between Religion and Philosophy. The divergence lately culminated in the famous discussion between Herbert Spencer and Frederic Harrison. These same opposite tendencies operating in the dawn of Mythology caused two distinct classes of primeval gods. The first and highest is unapproachable, unchangeable, inconceivable, and even unnamed, among some peoples. He presides over all and inscrutably and mysteriously directs the general destinies. He is Zeus of the Greeks, Dyaus of the Indians, Tyr or the unknown god of the Norsemen, El of the Hebrews. These conceptions approach most nearly to our conception of the Deity. But those gods most known, most loved, and most worshipped, and who filled the largest part undoubtedly of the lives of the primeval men, are the senders of the rain and sunshine. The gods of the harvest, of battles and of the chase; they are Osiris and Horus, Apollo, Hercules, Odin, Baldur, Thor.

Digressing for a moment at the conclusion it is just as true now as ever in primeval times that there are, when analyzed, different gods. To one, men pray for rain and for immunity from pests and plagues, and for blessings on relations and friends. Of the other they think when they contemplate the grandeur and infinitude of the universe and the omnipresence of law, which knows no good or evil, nor place, nor time.

Such were the primeval gods,—a hoping, fearing, loving, hating, sensuous people who anon filled all heaven with the din of conflict and then swept in clouds and rain over the miserable earth dwellers below. One after another, with the growth of knowledge, they have abdicated in favor of law, until only one remains; and He, one by one, dropped His special faculties until we have at last the unknowable and inconceivable God, whom even the agnostic does not deny, nay, who is clothed with such impenetrable mystery and majesty by the chief of Agnostics that a new theology threatens to arise from the contemplation of his attributes.

MORAL MICROBES.

The analogy between the laws which govern the material and the moral world, is so frequently noticed that no apology is needed for the acceptation of such similarity.

Physical scientists tell us that germs of the most destructive diseases are originated in the haunts of squallor, and are borne to other surroundings only to lie dormant until favorable conditions develop their activity and they enter upon their work of destruction.

Evidently then, if this be true, the course to be pursued, is, first to purify those localities where such germs are engendered, and, second, to adopt such precautionary measures as will prevent the development of those which may have survived a removal to other localities.

Equally important to the eradication of evil is the effort to trace the prevailing crimes to their sources, and discover it possible, what circumstances conduce to their propagation.

We are all familiar with the narrative from the Report of the N. Y. State Board of Charities, stating that the descendants of one profligate woman have cost the treasury over fifty thousand dollars.

It is highly probable that pains-taking inquiry would reveal many similar records, concerning vast numbers of our prison inmates. But, if we would possess invaluable data, we must go back farther than this, delve deep into the genealogy of that particular woman, find the germ—the moral microbe from which the evil sprung, and then follow up the conditions which surrounded her progeny, and note the development of this small demon into a monster of destruction.

Auguste Comte says "A moral transformation must precede any advance of society." Is it a moral transformation which we effect through the incarceration and punishment of our criminals? It cannot begin with the lowest stratum of society. It is imperative that the seed be sown in the hotbed of civilization, that the growth of purity and regeneration arise in the hearts of our law makers, our home makers, and child trainers, before it can be felt throughout the pulse-beat of the world.

The fashion of the day demands an approximately clean record, but it oftimes proves that he who covers with an appearance of morality the petty vices, is he who is most warmly applauded as a pattern saint.

We are all ready to discover the victims of great sins, to offer a helping hand with a horrified face, an open purse but never an open door, forgetting that perhaps in our own hearts there may at that hour lie dormant the germ, which if not destroyed may give to the world another generation of miscreants.

Every condition is comparative. The degradation of the gutter drunkard who has inherited an unbridled appetite and memories of a besotted parent, is no more a criminal than he who, reared amid refined and clear headed associations, permits an extra glass to befog his intellect. The woman whose public sins are as scarlet, if born with the microbe implanted in her breast, and nourished amid the haunts of vice, has no more cause to blush than the daughter of our highest civilization when she entertains a single impure thought.

'He fits boys to be men,' said an ardent admirer of Dr. Arnold. And nobly he fulfilled his mission!

'Boy' represents the strength and tendency of the preceding generations, plus the power engendered by a new combination of elements. If there is born within his breast a disposition to cavil at evil, to dissemble, to recognize self as the primal object of devotion, to shadow the eye from the glare of the truth, nothing but the companionship and example of persons holding the sternest but the tenderest morality, and filled with the spirit of brotherly love, can prevent the expansion of the evil, until to save itself from immediate danger the State resorts to the old expedient of gathering him within the folds of the penitentiary.

How can the parent who admits two standards of morals, one masculine, the other feminine, ever preserve his son from degrading his manhood? How is it possible for the children of a family to respect the highest type of morality, to reverence the handiwork of the Divine Father unless they are accustomed to think and speak of every law which He has framed, in a spirit of the strictest honor, and with the utmost freedom. To feel that everything which He has created is pure, and that it is our benighted sense which paints it otherwise.

A single shadow of deception darkens the child's whole horizon. He easily detects and instinctively follows the course of his teacher.

What can be more beautiful than the truthful and unrestrained explanation of the mystery of birth, that question which oppresses early youth and to the evasive, or even lying, answers which he receives many a man may date his unholy thought of the most serious relations of life.

There is no greater incentive to purity of purpose than the simple teaching of the little child to weigh his motives. To turn steadily away from the small temptations which surround him and to feel that however young, his lesson of self-control must at once begin. Tender years are no excuse for delay. As soon as a dawning intelligence discriminates between self and playfellow, it is capable of beginning the great work of discipline. If this were a rule of conduct rigidly enforced, who can suppose that the

youth of the next generation would indulge in senseless, immoral and vicious courses to the same extent as now?

There is no possibility of over-estimating the importance of a strict moral standard, of a clear personal record, of an ancestry who held themselves above petty vices and self indulgences. But there are thrown upon the charity of the wide world vast numbers of youths in whose breasts the fatal microbe is already planted, and whose only hope of escaping the sin, sowing broadcast the evil within them, lies in the aid which their moral nature receives from their fellow men.

In the building of a Reformatory for young culprits, the right spring has been touched. If the true feeling of brotherly love inspires the hand which directs the work, immeasurable good must result. Sever the offender from immoral associations. Keep about him those influences which are elevating and supremely humanizing. Lead him to forget the temptations of vice by surrounding him with attractions of virtue, and train him to respect himself too much to descend to a lower plane.

The grand point is not alone the abundant supply of wholesome food and healthful occupation, it is the constant presence, as well, of thoroughly interested and companionable persons whose excellent example is not too far removed from the reach of ordinary lads as to be a discouragement instead of an incentive.

A wisely selected superintendant might well be assisted by daily visits from at least one of a board of managers whose heart is in his work; who knows the boy nature and respects it; who will take them by twos and threes for a short drive, or an hour at his own pure hearthstone. Who will interest them in the labor they are bound to engage in, and who will show them that they are respected for what they achieve and will encourage the idea, that, to have belonged to a Reformatory means not disgrace, but removal from evil companionship.

It is curious to note in life, how strong an argument the dollars and cents column becomes, and the treatment of petty offenders by the moral method exhibits the record of financial success. We cannot afford to let the progeny of a miscreant cost us fifty thousand dollars—nay not fifty cents. The loss of material is fearful, for with judicious management such common sense practical reform as befits a well organized government transforms that which was formerly a burden into the resource of a state.

RELICS IN A CAVE.

Sometime since I visited a cave in the San Martin mountains, Los Angeles county, California, which contained some interesting Indian relics. It

is in a wild, rugged and picturesque region, and the cave which is one thousand and four hundred feet above the sea level, situated on the south side of a steep mountain, is difficult of access. It is a natural grotto in a somewhat friable rock, composed largely of small petrified oyster shells, most likely of pliocene origin. The excavation is about twelve feet deep and sixteen feet long, and not sufficiently high for one to stand upright. The bottom was covered with sand caused by the disintegration of portions of the roof and surrounding walls.

In this cavern were deposited nine baskets manufactured from tule, and varrying in size from six to twenty inches in diameter. With the exception of the smallest basket, which was found inside of a larger one, each was covered with a neatly fitting cap woven from the same material, and each basket stood on a mat of the same. Three or four of the baskets were in a good state of preservation, while the others were askew, or had been gnawed by wood rats which are abundant in this section, and had constructed a large nest in the cave.

One of these baskets contained fourteen notched sticks an eighth of an inch thick, from one to two inches wide, and from ten to fourteen inches in length. These sticks have been painted, some crosswise and others lengthwise, with streaks of red and probably blue paint. It is most probable that they were used for chronological purposes, each notch indicating a moon or other specific period. Some of these sticks have as many as one hundred notches. They are made of red wood and are perforated at each end.

Another basket contained thirty-three head-dresses of birds feathers. The wing and tail feathers of a variety of birds have been used, but the flicker [*colaptes chrysoides*] predominates. They were made by lapping the quill ends and sewing them together after which the feathers were alternated until the desired length was obtained. These dresses are from five or six inches to nearly a foot in width and from two to five feet in length. Some are plain white, while others are more ornamental, being made of different colored feathers.

In another basket was found forty-five whistles, made from the tibiæ of the deer, abont ten inches in length. One end had been cut off and the bone dressed down forming a mouthpiece, after which the cellular portion of the bone had been removed and a lateral opening made about three-sixteenths of an inch in diameter opposite which asphaltum had been placed in such a manner as to cause the instrument to emit one or more sounds when the operator blew in the end. These bones had been wrapped with bark or some other pliable substance, and a mass of asphaltum fastened on the larger end into which was embedded a small piece of baliotis shell.

But still more interesting specimens were found in another basket. These

consisted of four perforated stone discs or hammers containing handles. The discs are probably serpentine and measure from four to five and a half inches in diameter. The sides have been reamed, in the usual method of perforated discs, leaving the hole much smaller at the center. the handles are of *toyon* or bearberry which is amongst the hardest woods in southern California, and are from thirteen to seventeen inches in length. The handles are set a little slanting to the base, or flat side of the disc, and are fastened with an asphaltum cement. Two of the discs still retain paint markings. For what purpose they were intended is not quite clear to us. If for hammers they are the only ones of the kind of which we have heard in this country. The usual method of fastening the handle is by groove and withe, and not by drilling a hole through the implement. We are inclined to the opinion that these were used as implements of war, or were used in religious rites. But whatever may have been their use they are unique, as far as we know.

In excavating the bottom of the cave we found considerable basket work as though it had been covered with this material. A wedge was found, made of the base of a deer's antler, four and a half inches long by one and three-eighths inches in diameter, wrapped securely at the larger end with a kind of cord to prevent splitting when in use. Also a haliotis shell *Haliotis crasherodii*, having the holes filled with a cord, and used, probably, for a drinking cup. A shell ornament and portions of deer's antlers, and a serpentine implement for smoothing and straightening the tools for their basket work, were also found. The cave bears no evidences of having been used for a place of residence, but simply as a deposit for these specimens, most or all of which have doubtless been used in their dances and religious rites and ceremonies. How long these specimens have remained in the cave, it is difficult to determine. Being perfectly dry, and beyond the reach of rain or sunshine they would remain for a great length of time without decay.

STORAGE BATTERIES FOR MOTORS.

While one class of experimenters has been devising ingenious expedients to conduct currents of electricity to motors on moving cars, another has been no less indefatigable in seeking for ways and means to do away with the necessity for this by carrying the source of the electricity on the car. Both classes claim to have solved the problem. The last utterance in the *Electrical Review* comes from Baltimore and is a description of an experiment with a new storage battery. It is as follows:

BALTIMORE, July 17, 1885.

Editors of the Electrical Review:

A successful test and demonstration of the storage battery, as a motive power for city passenger railways, was made on the Union Railway, in this city, on Tuesday last. The Union Company have the Daft system in operation on the suburban branch of their road between Baltimore and Hampden—about two miles.

This road passes through one of the most hilly sections in Baltimore County. There is scarcely three hundred feet of level road the entire length. The heaviest grade on a tangent is 319 feet, and on a curve 352 feet per mile. The sharpest curve has a radius of but 50 feet, and the largest 89 feet.

One of the Daft cars was used for the experiment, on the floor of which 49 one-quarter horse-power (four-plate) cells were placed.

This battery was connected to the motor by a three-way switch for connecting either 29, 39 or 49 cells, according to the power required.

These cells were part of a lot that had been made for lighting purposes, and not intended for the purpose for which they were used. The total weight of car, with battery, motor and 18 passengers, was about 10,000 lbs. At start 29 cells were used, indicating an E. M. F. of 42.63 volts and 61 amperes. The total resistance in circuit was .6943 ohms. The horse-power developed was 3.4.

In passing around curves and ascending the grades, 39 and 49 cells were necessary. In the latter case, the total resistance was .83 ohm; the E. M. F., 72.18 volts; and the current, 87 amperes, developing 8.5 horse-power.

The speed attained was eight miles per hour on the level, and from four to six on the curves and grades.

Several trips were made over the road, in order to discover, if possible, the weak points in the system. None were developed.

The plans for this experiment were devised by Mr. A. H. Bauer, the electrician of the Viaduct Manufacturing Company, who has within the past two years made the storage battery practicable.

The success of this demonstration proves conclusively that the use of storage battery for street car purposes is the only solution of the problem of substituting electricity for horses in cities.

It is now the intention to put the system into service on the principal railways in Baltimore.

For that purpose, large cars, capable of carrrying sixty passengers, will be equipped with battery, motor, etc.

Sufficient battery power will be furnished to develope ten horse-power on the shaft.

All the plans for the system have been thoroughly worked out by Mr. Bauer, the details of which will be made public as soon as the patents are issued.

Judging from the interest shown by the different street railway companies in the work done by Messrs. Daft and Bauer, it is believed to be a question of but a short time when, for the purpose under consideration, horses will be displaced by electricity. C. D.

ELECTRIC RAILWAYS.

[A report read before a meeting of the stockholders of the Henry Electric Railway Co., July 14, 1885.]

Gentlemen:—At the suggestion of Col. Case, I make this report concerning the developement of the Electric Railway.

I will first briefly call your attention to the occasion and objects of our association.

In soliciting your subscriptions to the fund, I promised to demonstrate the feasibility of the system at an expenditure of $4,000, or less. This we have done, within three months from the date of my employment, and have a car running on the track. Since that time we have been vigorously at work experimenting with the view of reducing the system to the best practical basis.

In doing this, we have labored under great disadvantages.

In the first place, our car was not designed for such a purpose as that to which we have attempted to put it, and will not stand rigidly with the weight of the necessary machinery.

Secondly, the track on which we are operating is perhaps the poorest in the County; while the grades are more severe than upon 95 per cent of the roads in the country.

The work that we have had to do, although unpleasant, has constituted a severe test, and its accomplishment will be the best recommendation that our system can have.

My efforts have been directed to the end that we might take a loaded car up a six per cent grade, at the rate of eight miles per hour. I understand that a practical demonstration of this result will induce Mr. Holmes to adopt our system on his line. So far, we have not been successful, but have been gradually approaching this result. We can now take a loaded car up a five per cent grade at the rate of five miles per hour, which is equivalent to making, with two cars on a level track, a speed of ten miles per hour. We can purchase motors of four times the power of ours, and do four times the work, but I did not deem it necessary in my experiments to demonstrate the principles merely.

I can see chances to still increase the efficiency of our machinery, and expect better results shortly.

In this connection I will state that the machine we now have is a makeshift to demonstrate, in the easiest way, the principles involved; to learn, by practical experience, the forces and strains with which we have to contend.

We now need a car designed for the purpose, and new machinery con-

structed so as to stand any ordinary work on the track, and such as can be safely placed in a non expert's hands.

Concerning the inventions embraced in our schemes, I would say that the most valuable are those that are the most practical and useful and which cannot be circumvented by others.

The policy of an inventor is not only to make perfect machinery, but to protect by patents even inferior ideas which others might use.

We have copies of all the patents issued on the subject of Electric Locomotion, and find no principles that are not common property that we would care to use. Our first patent has been passed upon by the department at Washington, and twelve out of the fourteen claims which we make for new inventions have been allowed. The other two we do not need, but our attorneys are contending for them.

Our second patent has been applied for, and we are preparing the papers for a third.

While it is possible to run a motor fast or slow, it is a fact well known to electricians that to get the most efficient force from it, it should run at a certain, constant, steady rate of speed. To increase or decrease this is a direct loss of energy, or waste of fuel. My efforts have been to increase or decrease the speed of the car, without changing the movement or efficiency of the motor. Our patents cover the only two means I can conceive of for doing this. This opinion has been corroborated by a number of my expert mechanical friends.

Our mechanical movements are all new, and have never been used before in any connection. Our latest patent will cover some improvement in motors—means of changing same, so that when the car is forced down hill by gravity, the motor is changed to a generator, and induces a current of electricity which assists other cars up the grades.

Another feature is a system of underground conductors, which I regard as being far in advance of anything proposed, particularly for long lines. This has in view the utilization of condemned railroad rails, or cables for conductors, such as can be bought on this market for one cent per lb. Copper, according to weight, has double the conducting capacity of iron, but costs 17 1-2c. per lb.

The larger the conductors used, the less force we lose in transmission. The limit is only reached by figuring the interest on the cost of the conductors.

That electricity is the coming force for transmitting power, I am thoroughly satisfied, and this belief is strengthened by the published utterances of the best electricians of the country. Among them the men who laid the Cable, invented the Telegraph, Telephone and Electric light systems.

The reasons for this are many. First: The best locomotive made consumes seven lbs. of coal to the horse power developed per hour, whilst stationery engines are very common that do not use one-third of this amount. Second: Dummy engines that will accomplish what we are attempting, carry seventeen thousand lbs. dead weight, whilst we carry but forty-two hundred lbs.

Motors have but three wearing surfaces, while engines have a great many. By the use of motors the objectionable features of smoke and steam are avoided. The cost of equipping an electric road need not be over ten per cent greater than horse roads, and the cost for operating the same need not be one-third the expense.

In conclusion, I would urge upon you the necessity of providing for the completion of the work. JOHN C. HENRY, Electrician.

Before going to press, Mr. Henry handed in the following postscript: "Since making the above report we have increased the efficiency fully thirty per cent. We have run the car fifteen miles per hour on the level, and eleven miles per hour up a four per cent grade."

AN ARIZONA NATURAL BRIDGE.

During a visit to Arizona, I came across a natural bridge, an account of which may be of interest in connection with recent notes on the Virginia bridge.

A long ridge, about six hundred or eight hundred feet high, extends for some distance north from a point near which the Atlantic and Pacific railroad crosses the boundary between New Mexico and Arizona. This ridge is formed by strata of dark-red sandstone under light-red, and is capped by a stratum of fine conglomerate or coarse grit. These strata are broken, and present an rbrupt and generally perpendicular face to the west, sloping at an agle of fourteen degrees to the east, with the course of the stream, until they bury themselves below the alluvial sand. There are lower ridges, of corresponding structure, parallel to this on the eart and west. This ridge is cut by deep and narrow canons. At the mouth of one of these canons, just before it dips under the sand, occurs this bridge. It is about twenty miles from the railroad, and, as far as I know, has never been visited by white men. I was guided to it by my Indian scout. The canon extends west for about five miles above the bridge, and becomes deep, narrow, and wild; the sides, with their growth of hard-wood and pine, almost cutting off the light at mid-day.

The bridge is formed by a remnant of the overlying grit, which is continuous with it on both sides. The section cut through beneath it is of

light and dark red sandstone, the former showing very pretty cross bedding, and is non-conformable to the latter, which has much less dip. The bridge is sixty-five feet long, and fifteen feet wide at the narrowest point. It is two feet thick in the centre; and fifteen feet at the sides. The illustration, from a photograph taken at the time, will give a good idea of the position and proportions of the bridge; our ponies, standing underneath; serving for comparative measure. It will be seen that the canon is wider for a short distance above the bridge, which may be due to a tributary canon at that point.

It is difficult to give an explanation of this curious phenomenon; and I shall only suggest a possibility, in the hope that some one will find time to investigate it more thoroughly. If above the present grit there had been soft strata, capped again by grit, it might be explained on the principle of Swiss pot-holes; a waterfall being formed above, which wore a hole through the lower grit, and so undermined it, and cut out the sandstone beneath, as the at Trumelbach. But the grit has every appearance of being a continuous cap over the ridge. The grit shows, however, evidence of an inclination to break into blocks; and it may be that a large crack, thus formed to the west of the present bridge, allowed the stream to reach the soft sandstone, and so cut it away beneath.

A short distance off is another curious but not so uncommon phenomenon,—a 'petrified forest.' The stone tree-trunks lie just beneath the soil, or half exposed, fallen in all directions. I procured specimens which showed the bark, knots, roots and branches. The radiate arrangement of the wood-cells was very evident in some cases. There are a number of these 'petrified forests' in Arizona, I was told. I know only of one other on the Navajo reservation, and one near Flagstaff.—Science.

THE ROUND OF LIFE.

What I shall say on the above subject will not possess the merit of novelty to students of science, especially not to botanists, for the facts have been frequently given in better words than I can employ. But nearly all that has been heretofore written relative to the matter, is only to be found in scientific books or periodicals not conveniently accessible to the general reader; hence a few brief reflections on the subject cannot be amiss and may arouse interest concerning some of the by-ways that lead into the great thoroughfare of Life and Thought.

All terrestrial phenomena may be classed under two grand divisions: the organic and inorganic. To the first of these belong all manifestations of nature which show the presence of life, or vital force, and the capability of

self-movement. To the second belong those manifestations which evidence the absence of life and self-movement. The organic world could not exist without antecedent life—that is each living individual, whether plant or animal, must have descended from a similar, prior individual; but the inorganic world is the result of chemical and mechanical processes and its combinations are fortuitous. The inorganic world is again divided into two Kingdoms, one of which has been called the Vegetable, the other the Animal, Kingdom. In the higher forms of life it is an easy matter to draw a line between them; but as we descend to the lower forms it becomes very difficult to distinguish between the two Kingdoms. This is especially the case with those forms which cannot be perceived by the unaided vision and which must be examined by the aid of a microscope. But though the distinction between these different phases of organic life, in their external relations, is sometimes difficult to make out, it is really definite and certain, and can be readily resolved if the habits and characteristics of the doubtful organism can be determined. The grand and most obvious distinction lies in the fact that all vegetables, except some families of parasitic plants, and, perhaps, some species described as carnivorous plants, feed alone on inorganic matter, while animals derive their sustenance from organized matter.

From this fact the inference seems inevitable that vegetable life must have preceded animal life, for without vegetable food all animal organisms would quickly and utterly perish. While animals and plants differ so widely in their mode of life, that is in the food they consume, as well as in their organization and locomotive powers, they yet approach each other very closely in several essential points, and in their genesis are really identical. Actual life, or vitality, is the same in both animals and vegetables; the only difference being the structure of the house it dwells in. All plants possess, in some measure, the power of self-movement. Even the most quiescent, move as absolutely as the sensitive plant, venus fly-trap, or the stamens of the barberry; though their motion is not so rapid, and consequently not so apparent to ordinary observation. Whole families of microscopic aquatic plants move from place to place freely, with a spontaneous motion equalling that of some of the lower order of animals.

Plants, like animals, have their hours of sleep and rest. In the higher order of plants the young are developed in ovaries contained in the seed. Provision is also made in the parent plant for the support of its off-spring, and in sufficient quantities to last until the young plant becomes vigorous enough to draw its own sustenance from the elements. It is indeed from this provision of vegetables for their off-spring that animals derive a large portion of their nourishment; without it many could not exist. This stored

food is to be found in all kinds of seeds as well as in the roots and tubers of plants and their succulent stems.

But it is in actual life, or vital force, that all distinction between animals and plants are lost. In this respect the young lady and the rose that adorns her bosom are the same, and the like is true of the ox and the plant it feeds upon. In the simplest water plants of the sea-weed family the structure of the seed is at first a very minute rounded mass. When one of these globules escapes the mother plant it often swims about freely in the water in various directions with a truly spontaneous motion; and at this time it so closely resembles an animal organism that it is frequently mistaken for one. After enjoying this active life for several hours, it comes to rest, forms a covering of cellulose, and thereafter becomes a true vegetable cell, fixes itself to some support, germinates, and grows into the perfect plant. Each living plant cell carries on a circulation of its own. This may be seen in the transparent stems of Chara and many other water plants, and in the leaves of the Fresh-water Tape-grass. Here the fluid circulates in a steady stream, just beneath the wall, around each cell; passing up one side, across the end, down the other, and so round, to complete the circuit; carrying with it small particles, or the larger green grains, which make the current more visible. This circulation may also be seen in hairs of plants, particularly those of flowers,—such as the jointed hairs of Spiderwort, and the hairs of the nettle, looking like strings of beads, each bead being a cell. The substance which shows independent movement in the cells and hairs of plants and the little rounded mass of sea-weed is *protoplasm*. This constitutes life, or the physical basis of life. It is present in the circulatory system of animals as well as plants, and is in every respect characterized in the same way in both. But these particles are so very minute that to see them distinctly requires a magnifying power of six or eight hundred diameters. Every plant proceeds from a single extremely minute vesicle, or cell. Growth takes place through this vesicle, or cell, dividing by the partition of a cross partition into two such cells, cohering together; one of these into two more: and these repeating the process by partitions made in both directions, forming a cluster, or mass of cells essentially like the first, and all proceeding from it. So the plant is an aggregation of countless millions of little vesicles, or cells, essentially like the cell it began with in the formation of the embryo: and this first cell is the foundation of the whole structure, or the ancestor of all the rest.

Now it is impossible, that this little vesicle, or cell, which is but a very small fraction of a grain in weight, and so little as to require great magnifying powers to be seen, could increase itself into a large tree containing innumerable millions of living cells equal to itself, the whole many tons in

weight without the existence of vital force or actual life. To do this the little cell, and those proceeding from it, by some law unknown to us, have the power of converting inorganic, or dead matter into organic, or living matter, that is of feeding upon and assimilating inorganic substances. It is, therefore evident, that life is drawn from, and built up of non-life. We however, only know life as associating with, or following preceding life; yet, we do know that it is built up of the elements composing non-life, or inorganic things; that is, matter is taken up and from a state of death and inactivity is changed to a state of life and activity.

Plants are built up of carbon, hydrogen, and oxygen, with a small proportion of ammonia, and from two to ten per cent of other inorganic matter. We know the chemical composition of plants, but by bringing these elements together, we cannot produce life. As well might we expect a temple adorned with architectural beauty to spring into existence from throwing the raw material together, as to expect life to develope from bringing the elements together, that plants build themselves with. By some hidden law an almost infinitesimally small germ of life has the power of converting inactive matter into active living matter, to form plants. These, in turn, compose the food of animals, and are assimilated by them to form another complication of life, i. e., animal life. If the plant is burned, or suffers natural decay after death, it returns to its original elements and in precisely the same proportions as drawn from the earth and air, or, if the plant is devoured by an animal, precisely the same thing occurs at the death and decay of the animal. A little living germ, in some incomprehensible way, causes inactive matter to become active for a little season. It first manifests life and activity in the plant, then in the further complication of animal life, and at the death and decay of the plant or animal becomes dead matter again. Here is the whole round of physical life. It is drawn from dead matter, and, after a short interval of activity, returns to dead matter again. Is the germ, too, made active by some force inherent in matter? It sometimes remains inactive in the seed for many years, and then springs into life. But then it may be said to inhere in the seed, and so it is. We have no right however, to assume that conditions have never been such as to produce the germ itself from dead matter, or that such conditions do not now exist, or that they may not exist in the future.

ZOOLOGICAL ENIGMAS.

The largest land-serpent of which we have any trustworthy account is the *ular sawad*, or swamp-python, of 55 feet, which Sir Stamford Raffles saw

on the west coast of Sumatra, but a much larger boa seems formerly to have inhabited the tropical and sub-tropical regions of the old world. Pliny states that a serpent killed in the Pontine Swamps during the reign of the Emperor Claudius had the entire body of a child in its belly, and Seutonius mentions a python of 50 cubits (75 feet) in length that was killed near Agrigentos (the modern Girgenti) and exhibited in front of the Comitium.

But the strangest classical snake story (with the exception of the Laocoon myth) comes from Numidia, in Northern Africa, where, according to Valerius Maximus, a whole Roman army was kept at bay on a ford of the Bagrada, by a monster sepent that killed fourteen men who had attacked it with their broadswords, but which was at last crushed by a well-aimed stone shot from a *ballista*, used in the siege of fortified towns.

The largest South American boas are only 30 feet long, but, according to the Brazilian naturalist, Becera, the Indian tribes of the Pocantins River believe firmly in the existence of a *gusano cavador*, a monstrous subterranean serpent that tunnels its way through the mold and root-tangle of the primeval forest; living on burrowing rodents and armadillos, and such larger animals as happen to approach the entrance of its den. Becera states that he went to see one of these dens fourteen miles west of the Mission of San Rafael, and found a spacious burrow opening on the bank of a brook under the roots of an overhanging Adansonia tree, and lined with a peculiar viscid substance as if a slimy reptile had forced its way through the opening. The tunnel measured about four feet in diameter, but seemed to get narrow further down. For sixty varas (about as many yards) from the tree ruptures and upheavals of the soil could be traced along the surface of the ground; but as such ruptures are sometimes caused by the fall of a large tree and the consequent strain on the roots, Becera did not quite know what to make of the matter. The accounts of the Indians, though strangely unanimous on some points, are in other respects evidently preposterously absurd, for a chief of the Guinibas assured the naturalist that the gusano was a hairy serpent, and had short, sharp teeth, like an ocelot (sort of catamount, but was too timid to use them for homicidal purposes.

The egg-shaped cirripeds (*Balanus Marinus*) were probably the prototypes of the "barnacle-goose" eggs mentioned in the natural histories of the Middle Ages, and seals of the mermaids; but where did our forefathers see the originals of their unicorn emblems? Was it in Java, where fanciful representations of the one-horned rhinoceros figures here and there in old temple-sculptures; or was it in Southern Africa, where the gnu with its equine hoofs, tail and mane might pretty well pass for a horned horse, especially from a distance? And it may be doubted if, before the invention

of gunpowder, the shyest of all African antelopes had ever been closely examined.

The harpy myth probably originated in Southern Asia. In Siam, Malacca and the Sunda Islands there are bats that attain the size of a squirrel (flying-foxes the English settlers call them), and, being exclusively frugivorous, are a worse pest than the English sparrows in cherry time; for their alimentary needs are out of all proportion to their size, and the kalong or Cingalese flying-fox can eat his own weight in half a day. Like caterpillars, they seem to digest about as fast as they can swallow. Donald Burns, a pet-dealer of Roosevelt street, New York, imported last year some twenty or thirty pair of these eupeptic night-birds; but, finding the demand rather limited, shipped them off to all the Zoos in the country, rather than be bothered with the exigencies of their monstrous appetite. Half an hour after devouring eighteen ounces of stewed vegetables apiece, they would commence their clamor for lunch, clambering up to the brink of their straw boxes and shrieking away with quivering wings. They gulped their food like crocodiles, and after exhausting their appropriation would swing their heads to and fro with fretful squeaks, and now and then vent their spleen by attacking their next neighbors, who would never defend themselves until they had gobbled up their rations to the last crumb.

It may be imagined what damage a flock of such gluttons can do in a banana garden. In Batavia, trees have to be protected by nets to save a single fruit, and if currants, etc., are dried in the open air, they have to be secured every evening, for a few minutes after sunset the winged imps begin to swarm, and are greedy enough to snatch their favorite vegetables from under the very eyes of the cultivator. If driven back, they will cling to the next tree, fluttering and screeching, and, if thoroughly scared, ease themselves after the manner of frightened monkeys. All these things the ancients used to relate about the harpies—winged demons whom the gods sent in their wrath for the affliction of obnoxious mortals, whose food they would snatch out of their hands and defile what they could not devour.

The belief in vampires is less explicable. Few persons may be aware that in the Danubian principalities the belief in the ghoulish practices of mysterious night-walkers, is still as prevalent as the night-air superstition in the United States. Ninety per cent. of our fellow-citizens honestly believe that they cannot open a bedroom window after dark, without admitting affliction in the form of a lung diseasing draught; and nine out of ten Bulgarian housewives never retire for the night without placing a crucifix near the threshold, as a precaution against the visits of the Vrokalaka. The bodies of sleepers who had neglected that precaution were found almost *exsanguis* —as nearly bloodless as if they had passed a night in a Florida cypress

swamp, and with the marks of the vampire's teeth still visible on their necks and arms. If the sleeper awakened in time the ghostly visitor would disappear like a shadow, not apt to return for a while, though persons who had once undergone the horrid operation were ever afterward subject to strange fainting fits that aided the ghoul in the accomplishment of his hellish designs. Whole archives full of testimony on the subject have been collected by German and Hungarian publicists; and the most singular theories have been advanced to explain the origin of the strange belief.

Prof. Raupt's explanations are mostly mythological, but a recent Hungarian writer, Maurus Tokar, seems to incline to the opinion that the vampire superstition has a zoological basis, viz., the existence of nocturnal *Miudes*, allied to the Cingalese land leeches, and gifted with the caution of the South American vampire-bat. In support of this hypothesis the Hungarian naturalist quotes the testimony of many Servian and Roumanian physicians, and one very curious story from southern Russia.

A few miles east of the City of Berislav, near Odessa, there is an estate of pastures and forest lands almost surrounded by two affluents of the Dnieper, and containing an old fuedal mansion which for generations has been the favorite country seat of the Counts Lermonhoff, all famous for their hospitality and passion for field sports. In the winter of 1826, one of these Muscovite Nimrods had his house full of friends, and one of his guests had to be quartered in a turret-room, which, on account of its defective ceiling and consequent liability to dampness, had not been used for years. In the twilight of the next morning the guests assembled for breakfast, as they wanted to get an early start for the hills; but their host noticed that one of the chairs remained vacant. After waiting for a quarter of an hour or so the Count compared notes with his major-domo and ascertained that the missing guest was the gentleman quartered in the turret-room.

They knocked at the room and waited and knocked again, but finally opened the door by force. Their guest was dead. Twelve hours ago he had been full of fun and merriment; but there could be no doubt of it, he had died during the night, and probably before midnight, for his body had already turned rigid. "A stroke of apoplexy" was the verdict of the survivors, who after a day or two resumed their programme of amusements. But eight months after an exactly similar episode set the whole neighborhood agog. During the absence of the proprietor, some officers of a cavalry regiment temporarily stationed in the village, were introduced by an old friend of the family, and, being caught in a rain storm, were obliged to accept the hospitality of the ladies, who, in stress of circumstances, quartered a tipsy old Major in the turret-room. The next morning the old man was found dead in his bed. The surprise of his comrades was far surpassed by

the consternation of the ladies, who, however, for the time being, were glad to accept the explanation of his brother officers, that the father of the deceased had died in a similar way, and that it might be in the family, with covert hints at the bibulous propensities of the old trooper. But a day after the Count returned the "turret-chamber" was subjected to rigorous examination. Every piece of furniture was removed and cleaned, the defective tapestry was scraped off and replaced by a coat of whitewash; the door and the window sashes were pried apart and tightened, and every cranny of the room was carefully scrutinized; but the turret-room refused to yield up its mystery.

It was remembered that one of the fatal nights had been by no means unusually damp; that the dampness of the room was, in fact, not worse than that of many other apartments of the old house; and the Count, dissatisfied with the result of the investigation, gave positive orders that the room should never again be used for a guest chamber.

That was the summer of 1824. A few days before the Christmas feast of that year, the Count's son, an adventurous and light-hearted young student, returned from college, and though the village gossips had already acquainted him with all the current details of the turret story, he was evidently much impressed with his mother's account of the mysterious affair. All the next day he cross-examined witnesses, and, contrary to his wont, seemed rather taciturn that evening, and, pleading fatigue, retired soon after supper. He had to keep a rendezvous. Half an hour after he had retired to his room there was a tap at the door, and the old major-domo slipped in on tiptoe. Plied with wine and money, the old man became communicative, and after a whispered consultation, the two conspirators packed a lunch-basket with sweetmeats and bottles, loaded a brace of pistols and started for the turret-room. Nobody had heard their movements, but about an hour after midnight, the whole house was startled by a series of piercing shrieks. Door after door opened, bewildered servants ran to and fro, till at last Count Lermonhoff flew up stairs and rushed into the turret-room. His worst suspicions were confirmed. On a pallet, in a corner of the hateful chamber, lay his eldest son—a corpse. The old steward, almost crazy with fear and horror, had at last recovered his speech, and volunteered a full confession. At the urgent request of his young master he had unlocked the mysterious room, lighted a good chimney fire, and procured an assortment of books and other articles, to pass the night as cheerfully as possible. Their plan was to watch by turns, and at 11 o'clock the old man had tucked himself up for a short nap, and, as he thought, had hardly been asleep for more than half an hour, when he was waked by a scream that made his blood freeze. What had happened he was unable

to say; all he remembered was that in his last agony the unfortunate man had thrown his head to and fro, and pressed both his hands over his temple, where they remained even now, firmly interlocked and rigid in death.

When they at last succeeded in unclasping his hands they found under his fingers, with its sting embedded in the seams of its victim's skull, an unknown animal, which can now be seen in a vial of spirits of camphor, in the Museum of Odessa. In shape the nondescript appears like a cross between a leech and a lizard, but its tail, like that of a scorpion, terminates in a sharp point, and its skin seems to have been more wrinkled than that of the two animals which it most nearly resembles, though that may be due to the action of the antiseptic fluid. Where it came from—if it had lurked in the fissures of the ceiling or entered by some secret aperture—has never been explained; but no soul in Berislav doubts its instrumentality in the death of the last three occupants of the turret-room.—*Enquirer.*

THE QUEST FOR THE PRIMEVAL EDEN. *

A serious effort to prove that the Eden of the human race was situated at the North Pole may well provoke a smile of incredulity. Dr. Warren writes with the spirit of earnest conviction; "of the correctness of his position he has no doubt, and of the preparedness of the scientific world to accept it he is also confident." Such faith will remove mountains, and in this instance there are extraordinarily great mountains to be removed.

The quest for the primeval Eden has always had a fascination for speculative theologians and adventuresome explorers. It is a proof of the sway of natural and historical science, that the solution of this question should now be undertaken more in the interest of ethnology, archæology, and biology, than of theology. In reading this book one is struck with the meagreness of the attention devoted to what may be called the Biblical aspect of the question; the author is more concerned about Greek cosmogony than about Genesis. How to explain the topography of the Garden of Eden, with its "quadrifurcate river," may be of subordinate interest when compared with the question of the distribution of the human family from one supposed centre of origin.

Starting from the nebular hypothesis, Dr. Warren arrives at the conclusion that "while Paradise may have been anywhere, the *first* portions of the earth's surface sufficiently cool to present the conditions of Eden life were assuredly at the Poles." Then, without stopping to debate "the antiquity of man," he assumes that man was placed upon the earth just as soon as

* Paradise Found. The Cradle of the Human Race at the North Pole. A Study of the Prehistoric World. By William F. Warren. Boston: Houghton, Mifflin & Co.

any part of it was habitable; and the conclusion must follow as a matter of course. Space will not permit us to follow in detail the author's application of the eight-fold scientific test to his theory. A few strictures must suffice. We fail to see how the glories of the polar day and night shed any light upon the problem. The argument from physiographical geology hardly takes any account of the influence of the glacial period upon the condition of the earth's surface at the time of man's advent. The "eradiation" of the flora and fauna of torrid and temperate zones from polar regions rests on insufficient evidence.

The author next tries to find confirmation for his theory in ethnic traditions. It is in this part of his work that Dr. Warren especially shows the breadth of his reading, and brings to view some remarkable coincidences. The chapter on Ancient Cosmology and Mythical Geography is of especial interest. The opinion of Dr. Samuel Beal is made to do good service: "I have no doubt that the idea of a central mountain, and of the rivers flowing from it and the abode of the gods upon its summit, is a primitive myth derived from the earliest traditions of our race." This mountain of the gods, the theme of Hindu mythology, becomes the central figure in the theory of a Polar Eden, and is accompanied by "the tree of life" and "the four rivers" in Hindu, Chinese, and Iranian tradition. In these myths, the expressions "Centre of the Earth," "End of the Earth," "Axis of the Earth," "Omphalos," are made to mean the Arctic Pole. Greek students will be amused at the etymology of "the sacred expression" *meropes* as "the men sprung from Meru," even if Renan did discover it. How many Biblical scholars will accept the interpretation of *Kedem*, Gen. ii, 8, as meaning "front country," and make "front" stand for "north"? In the treatment of these traditions and legends, has not the author neglected his own caution, not to forget that in interpreting the cosmological and geographical references of ancient religious writings we have to do with ideas that are often expressed in a poetical and symbolical form? In weighing the writer's argument, we are tempted to quote against him his own citation from Hudibras:

> "He knew the seat of Paradise,
> Could tell in what degree it lies;
> And, as he was disposed, could prove it
> Below the moon or else above it."

Dr. Warren is of necessity a special pleader, and, like all special pleaders, he falls a victim to his own ingenuity. As an illustration may be cited his interpretation of *polyptychos* as applied to Mount Olympus, in the sense of "*many layers or thicknesses.*" This epithet, he goes on to say, "pictures that world-old conception of a firmament not single-storied, but

with a heaven above heaven, to the 'third,' or the 'seventh,' or the 'ninth.' These heavens were conceived of by Homer himself as in layers one above another, like the curved *laminæ* of a shield. And what adds to the fitness of the comparison and to the fitness of the cosmic adornment of Achilles' shield, is the fact that to the *omphalos* of a shield there corresponded the central and ever-abiding *Omphalos* of the skies." But what says our author of the application of this same term to Mount Ida and to the ridges of Phocis?

Among the most readable chapters of the book are those entitled "The Origin and Earliest Form of Religion," The Philosophy of History," and "The Theory of the Development of Civilization." But the connection between these questions and the location of the Eden of the race at the North Pole is a slender one; an Equatorial or an Antarctic Pole would do about equally as well or as ill in the solution of these problems. The wonder is not that Dr. Warren has failed to convince his readers, but that what at first glance seems a wild fancy should be made to seem worthy of serious consideration. Nor can anyone deny the laborious research and heroic devotion with which the author has pursued his enquiry.

The book is written in an attractive style. Possibly a less lavish use of such complimentary epithets as "distinguished," "eminent," "admirable," in referring to various authorities, would befit a work that aims to be a quasi-scientific treatise.—*The Dial.*

ASPECTS OF THE PLANETS FOR AUGUST.

VENUS

is evening star, and takes the first rank on the planetary annals of August, for two reasons. She has entered upon her period of visibility, and she figures as chief actor in the incidents that diversify the month. She will be the most interesting star in the heavens, from the present time until the end of the year, the distance between the queen of the stars and the sun increasing all the time as she moves on her eastward course until the 8th of December, when, reaching her eastern elongation, she commences to retrace her steps toward the sun. Therefore, one of the most charming pages of planetary lore, written in characters of gold, on the blue vault that encircles the earth, is unfolded on moonless nights for the observation of the student of the stars.

Unfortunately, our sister planet does not take on the most favorable aspect, on account of her increasing southern declination. It is well known that the farther south the sun is, the shorter is the path he describes in the heavens, and, consequently, the shorter the day. For the same reason

when Venus is far to the south of the equator, her path in the heavens follows the same law, and her stay above the horizon is correspondingly lessened. The result is that though the distance between Venus and the sun is constantly increasing, she sets only about an hour after the sun, through August, September, and the first part of October. On the 1st of November, she sets two hours after the sun, and on the 1st of December she shines with bewitching grace for three hours after the disappearance of the sun. As, however, the twilight shortens with the shortening days, and her brilliancy and size increase with her approach to the earth, she will be more easily visible and far more beautiful as the autumnal months fulfill their course.

There is only a difference of ten minutes on the 1st of the month in the time of setting of Venus and Jupiter. On the 6th the former overtakes the latter, the conjunction taking place at 2 o'clock in the morning, Venus being 26 minutes south. The planets will be below the horizon when at their nearest point, but they will be near enough together on the evenings of the 5th and 6th, to form a lovely picture in the glowing twilight. On the evening of the 6th the planets will have changed places, Venus being on the east.

On the 8th, at 10 o'clock in the evening, Venus is in conjunction with Mercury, being at the time 3 degrees, 42 minutes north. It will be remembered that, on the 17th of July, the same planets were in conjunction. They were then both moving eastward, and Mercury, the swift-footed, overtook and passed his fair rival in the race. He has since reached his eastern limit, and, retracing his steps, again meets and passes Venus as he draws nearer to the sun. Hence the two conjunctions with so short a space of time.

On the 24th, Venus, still traveling eastward, encounters a third planet. Uranus is the fellow actor in the scene. They meet at 9 o'clock in the morning, Venus being 13 minutes north. The fair evening star then proceeds unmolested in her course without meeting a brother planet for the rest of the year.

Venus, not contented with paying her respects to Jupiter, Mercury, and Uranus, draws near on the 19th to Beta Virginius, a star of the 3d magnitude in Virgo, the planet being at the time 24 minutes north.

The right ascension of Venus on the 1st is 10 h. 24 m.; her declination is 11 degrees 35 minutes north; her diameter is 11.6 seconds; and she is in the constellation Leo.

Venus sets on the 1st a few minutes after 8 o'clock in the evening; on the 31st she sets at half past 7 o'clock.

JUPITER

is evening star. We award to him the second rank, as this is the last month he will hold the place of evening star during the present year. Before the month closes, his bright presence will be missed among the starry throng, for he will be eclipsed in the sun's rays. He must therefore be left to pursue his invisible course, while his belts, spots, and clouds will be hidden from terrestrial telescopes. He does not bid good-by to the earthly domain without mingling in the events of the month.

On the 4th, at 4 o'clock in the afternoon, he is in conjunction with Mercury, two degrees and thirty-two minutes north. Bright eyed observers may be fortunate enough to pick up the largest and the smallest of the planets in near vicinity, for Mercury should be visible about this time to the naked eye, and Venus follows closely on the track of both. The conjunction of Jupiter and Venus on the 6th, has already been described.

On the 27th, at 6 o'clock in the morning, Jupiter is in conjunction with Mercury for the second time in the month, being six degrees and one minute north. The explanation is the same as in the case of Venus. For Mercury having arrived at his eastern goal, on retracing his steps, overtakes the more stately and slower moving planet.

The right ascension of Jupiter on the 1st is ten hours and forty-one minutes; his declination is nine degrees and twenty-five minutes north; his diameter is thirty seconds, and he is in the constellation Leo.

Jupiter sets on the 1st, about a quarter after 8 o'clock in the evening; on the 31st, he sets about half past 6 o'clock.

MERCURY

is evening star, and is a near neighbor to Venus and Jupiter during the month, making one conjunction with the former, and two conjunctions with the latter planet, as has been stated.

On the 7th, at 3 o'clock in the morning, he reaches his greatest eastern elongation, being twenty-seven degrees and twenty-three minutes east of the sun. He is then so situated as to be visible to the naked eye, although not under the most favorable conditions. He is indeed at his maximum distance from the sun, but like Venus, is moving too rapidly southward to present his best aspect. Southern observers will enjoy a fine view of the fiery little planet at the time of his elongation. Observers who succeed in finding Venus and Jupiter, will find Mercury on the evening of the 6th, a little east, and about three degrees south of the larger planets. They all set not far from 8 o'clock.

The right ascension of Mercury on the 1st, is ten hours and thirty-one minutes, his declination is eight degrees and twenty-three minutes north; his diameter is seven seconds, and he is in the constellation Leo.

Mercury sets on the 1st, a few minutes after 8 o'clock in the evening; on the 31st, he sets soon after 6 o'clock.

URANUS

is evening star. Venus overtakes and passes him on the 24th, as he travels westward, approaching conjunction with the sun.

The right ascension of Uranus on the 1st, is twelve hours and one minute; his declination is no degrees and thirty-five minutes north; his diameter is three and four-tenths seconds; and he is in the constellation Virgo.

Uranus sets on the 1st, about 9 o'clock in the evening; on the 31st, he sets soon after 7 o'clock.

SATURN

is morning star, and is by far the most interesting of the three planets that precede the sun. He rises on the 1st, about 2 o'clock, and at the close of the month makes his appearance soon after midnight, and is a lovely object to reward the gaze of the observer in the small hours in the morning. The mysterious rings are now open to their widest extent, the planet is drawing near perihelion, and is also approaching the earth. By the last of September Saturn will be above the horizon at half past ten o'clock, and will not only be delightful to behold with the naked eye, but will afford a rare opportunity for telescopic research.

On the 5th, at 3 o'clock in the afternoon, Saturn is in close conjunction with Mu Geminorum, a star of the third magnitude in Gemini, passing four minutes south.

On the 6th, at 3 o'clock in the afternoon, he overtakes Mars. The planets are in conjunction. Saturn being one degree and twenty minutes south.

The right ascension of Saturn on the 1st, is six hours and fourteen minutes; his declination is twenty-two degrees and thirty minutes north; his diameter is sixteen seconds; and he is in the constellation Gemini.

Saturn rises on the 1st, ten minutes before 2 o'clock in the morning; on the 31st, he rises a few minutes after midnight.

MARS

is morning star. Besides being in conjunction with Saturn on the 6th, he also is in conjunction with Mu Geminorum, being at the time one degree and sixteen minutes north. Thus, Mars, the star, and Saturn are almost in line, the star almost touching Saturn. The double conjunction is invisible as it occurs at 3 o'clock in the afternoon, but though the actors in the scene will have changed places on the morning of the 7th, they will still be near enough to make an interesting celestial picture, that will amply repay an early riser for making the required effort. A small telescope or opera glass will aid the observer, who will find the planets in favorable position at 3 o'clock in the eastern sky.

The right ascension of Mars on the 1st, is six hours and one minute; his declination is twenty-three degrees and forty-nine minutes north; his diameter is four and eight-tenths seconds; and he is in the constellation Gemini.

Mars rises on the 1st, about half past 1 o'clock in the morning; on the 31st, he rises about 1 o'clock.

NEPTUNE

is morning star. On the 18th, at 4 o'clock in the morning, he reaches quadrature with the sun on his western side, and henceforth he is nearer to the earth than he is to the sun, that is, he appears to be.

The month closes with Neptune, Saturn, and Mars on the western side of the sun as morning stars, and with Mercury, Jupiter, and Uranus, and Venus on his eastern side as evening stars.

The right ascension of Neptune on the 1st is 3 h. 34 m.; his declination is 17 degrees 27 minutes north; his diameter is 2.5; and he is in the constellation Taurus.

Neptune sets on the 1st at half past 11 o'clock in the evening; on the 31st he sets at half past 9 o'clock.

THE MOON.

The August moon fulls on the 25th, at 25 minutes after midnight. The moon is in conjunction with Neptune on the 4th at 3 h. 49 m. P. M.; being at the time 2 degrees 45 minutes south. On the 7th, at 9 h. 5 m. A. M., she is in conjunction with Saturn, being 4 degrees 13 minutes south. Also on the 7th, 43 minutes later at 9 h. 48 m. A. M., she is in conjunction with Mars, being 5 degrees 33 minutes south. The conjunction is invisible, but the waning moon will be near the two planets on the morning of the 7th. On the 11th, at 9 h. 2 m. P. M., the new moon of the 10th is in conjunction with Jupiter, being 2 degrees 31 minutes south. On the 12th, at 3 h. 36 m. A. M., the moon is in conjunction with Mercury, being 1 degree 55 minutes north. On the same day, the 12th, but nearly four hours later at 7 h. 12 m. A. M., she is in conjunction with Venus, being 2 degrees 13 minutes south. The crescent moon and evening star, though not near each other, will be fair to see on the evening of the 12th. On the 13th, at 5 h. 49 m. A. M., the moon is in close conjunction with Uranus, being 17 minutes north. On the 31st, our satellite again commences her round. She is in conjunction with Neptune for the second time during the month at 10 h. 6 m. P. M., being 2 degrees 52 minutes south.

AUGUST

presents a full chapter of planetary incidents. There is an unusual stir among the members of the sun's family of worlds. The fairest of the stars pays her respects to her august brother Jupiter, to the swift-footed Mercury, and to the slow moving Uranus, while she fills out her portion of plan-

etary work by a close conjunction with Beta Virginius. The prince of planets pays his court twice to the smallest of his brethren, who at least can outrun him in the race if he can do nothing else. The ring-girdled planet and the god of war meet and change places on the celestial road, and both planets pay their respects to the small star, Mu Geminorum, at nearly the same time, the approach in Saturn's case being an appulse, for 4 minutes of arc is in celestial mathematics a small space to intervene between two visible heavenly bodies. As the month passes, the light of Jupiter grows dim and fades away, Venus slowly advances to easy visibility and will soon put on her queenly apparel, Saturn is superb with his wide open rings and the beaming light he borrows from a nearer approach to the sun, while the day of Martian importance nears the dawn.

METEOROLOGICAL NOTES FOR JULY.

[LOCUS, KANSAS CITY.]

Date	Max.	Min	8 A. M.		12 M.		3 P. M.		7 P. M.		Rainfall.
July			Ther.	Bar.	Ther.	Bar.	Ther.	Bar.	Ther.	Bar.	
2	70	57	67	30.11	68	30.11	68	30.06	68	30.06	0.30 inch
3	80	61	69	30.11	78	30.09	79	30.10	77	30.06	
6	82	59	69	30.01	77	30.06	79	30.06	78	30.06	1.17 inch
7	89	62	76	30.04	85	30.06	87	30.04	85	30.04	
8	92	73	80	30.04	88	30.04	89	30.04	80	30.03	
9	92	71	81	30.12	90	30.13	89	30.11	83	30.11	
10	75	67	75	30.19	72	30.19	68	30.16	71	30.10	1.09 inch
11	81	66	73	30.16	81	30.15	79	30.11	77	30.09	
13	93	65	79	30.07	90	30.08	90	30.06	87	30.09	
14	92	66	79	39.04	90	29.96	91	29.90	66	29.95	
15	92	64	79	29.96	90	29.95	92	29.90	87	29.87	
16	96	65	83	29.89	93	29.91	94	29.84	89	29.94	
17	77	65	71	30.23	72	30.27	77	30.24	73	30.24	1.23 inch
18	93	67	76	30.20	89	30.17	99	30.10	88	30.08	
20	94	71	81	30.04	91	30.04	92	29.99	89	29.97	
21	96	73	81	30.07	92	30.07	93	30.04	89	30.02	
22	94	72	81	30.04	92	30.02	88	29.99	76	29.97	0.08 inch
23	94	72	79	30.06	89	30.07	93	30.01	89	29.96	
24	93	73	81	30.06	91	30.06	92	30.01	87	29.99	
25	89	70	73	30.02	85	30.03	88	29.99	86	29.97	0.52 inch
27	93	68	79	30.16	90	30.19	92	30.19	80	30.15	1.40 inch
28	95	72	83	30.17	92	30.17	93	30.12	89	30.09	
29	96	75	85	30.17	93	30.17	94	30.06	91	30.04	
30	95	74	85	30.09	94	30.08	94	30.04	91	30.01	
31	87	69	75	30.08	85	30.02	87	30.06	84	30.03	0.19 inch

WAR DEPARTMENT, SIGNAL SERVICE, U. S. ARMY.

Division of Telegrams and Reports for the Benefit of Commerce and Agriculture. Meteorological Summary, for the month of July, 1885. Station, Leavenworth, Kansas.

DATE. 1885.	BAROMETER. DAILY MEAN	TEMPERATURE. DAILY MEAN.	TEMPERATURE. MAXIMUM	TEMPERATURE. MINIMUM.	Rainfall. DAILY INCH	GENERAL ITEMS.
JULY.						
1	30.050	65.2	71.0	60.2	.04	Highest Barometer 30.132; date 17th.
2	29.971	65.3	71.0	59.0	.08	Lowest Barometer 29.701; date 16th.
3	29.968	69.5	78.0	62.4	.....	Monthly Range of Barometer .431.
4	29.873	73.7	87.0	62.5	.43	Highest Temperature 98 degrees; date 28th.
5	29.766	67.7	74.0	63.5	.83	Lowest Temperature 59 degrees; date 2d.
6	29.899	71.0	85.0	60.0	.....	Greatest Daily Range of Temperature 26.4 degrees on the 14th.
7	29.887	78.7	91.0	67.0	.....	Least Daily Range of Temperature 11 degrees on the 10th.
8	29.893	82.0	92.5	72.0	.....	Mean Daily Range of Temperature 20.0 degrees.
9	30.001	79.0	88.0	74.0	.....	Mean Daily Dew-point 68.9.
10	30.047	68.3	76.0	65.0	.39	Mean Daily Relative Humidity 75.5.
11	29.994	73.0	80.5	65.0	.....	Prevailing Direction of Wind, South.
12	29.925	76.7	88.5	65.0	.....	Total Movement of Wind, 4,315 Miles.
13	29.929	79.0	92.0	70.0	.....	Highest Velocity of Wind and Direction 26 Miles Northwest, on the 4th.
14	29.829	78.7	93.4	67.0	.22	Number of Foggy Days, None.
15	29.764	83.0	93.0	72.0	.....	Number of Clear Days, 12.
16	28.831	83.7	97.5	74.0	.....	Number of Fair Days, 15.
17	30.110	71.5	81.0	65.0	.04	Number of Cloudy Days, 4.
18	30.000	82.7	94.5	70.0	.....	Number of Days on which Rain or Snow fell, 12.
19	29.907	84.0	97.0	72.0	.....	Depth of unmelted Snow on ground at end of month, None.
20	29.865	83.0	94.0	73.2	.....	Dates of Auroras, None.
21	29.913	82.8	94.5	72.0	.....	Dates of Solar Halos, None.
22	29.876	81.3	94.5	73.0	.....	Dates of Lunar Halos, None.
23	29.888	84.5	97.0	74.7	.....	Dates of Frosts, None.
24	29.906	80.2	90.5	72.0	.09	
25	29.882	78.7	88.0	72.0	1.00	
26	29.969	78.7	90.5	68.0	.85	
27	30.019	79.5	92.5	69.5	.17	
28	29.997	84.0	98.0	73.0	.....	
29	29.939	85.7	97.0	76.0	.....	
30	29.930	85.7	96.0	75.5	.....	
31	29.913	79.0	88.0	68.4	.42	
SUMS	927.740	2415.8	275.4	213.2	4.56	
MEA'S.	29.927	77.9	88.8	68.8	.....	

COMPARATIVE MEAN TEMPERATURE.

1871	77.6	1878	80.3
1872	78.4	1879	79.8
1873	77.5	1880	78.2
1874	82.8	1881	80.2
1875	77.6	1882	72.5
1876	78.9	1883	76.8
1877	76.3	1884	77.3

COMPARATIVE PRECIPITATIONS.

1871	5.20 inches	1878	3.08 inches
1872	9.99 "	1879	4.99 "
1873	2.04 "	1880	6.86 "
1874	3.23 "	1881	1.72 "
1875	8.82 "	1882	3.44 "
1876	4.01 "	1883	3.58 "
1877	5.34 "	1884	9.43 "

CHAS. DIEL,
Sergeant, Signal Corps, U. S. A.

WEATHER REPORT FOR JULY, 1885.

Prepared by Professor F. H. Snow, of the University of Kansas, from Observations Taken at Lawrence.

The first twelve days of this month were, with one exception, remarkably cool for the season. This brought the average temperature for the entire month below the July mean, although sixteen of the last nineteen days were oppressively hot. The rainfall was above the average and was unusually well distributed.

Mean Temperature—77.06 degrees, which is 1.16 deg. below the July average. The highest temperature was 96 deg. on the 16th ; the lowest was 56 deg. on the 2d, giving a range of 40 deg. The mercury reached 90 deg. 17 times. Mean temperature at 7 a. m., 73.20 deg. ; at 2 p. m., 85.64 deg. ; at 9 p. m., 74.71 deg.

Rainfall—6.03 inches, which is 1.53 inches above the July average. Rain fell on 13 days. There were 5 thunder showers. The entire rainfall for the 7 months of 1885 now completed has been 21.84 inches, which is 0.26 inch above the average for the same months in the preceeding 17 years.

Mean Cloudiness—43.76 per cent. of the sky the month being 5.79 per cent. cloudier than usual. Number of clear days (less than one-third cloudy) 15 ; half-clear (from one to two-thirds cloudy) 9 ; cloudy (more than two-thirds) 7. There were three entirely clear days and four entirely cloudy. Mean cloudiness at 7 a. m., 50.97 per cent. ; at 2 p. m., 42.90 per cent., at 9 p. m., 37.42 per cent.

Wind—S. W., 40 times ; N. E., 16 times ; S. E.,13 times ; S., 9 times ; N. W., 9 times ; E., 4 times ; W., twice. The total run of the wind was 8,422 miles, which is 400 miles below the July average. This gives a mean daily velocity of 271.68 miles and a mean hourly velocity of 11.32 miles. The highest velocity was 40 miles an hour on the 8th and 16th.

Barometer—Mean for the month; 29.065 inches ; at 7 a. m., 29.072 inches ; at 2 p. m., 29.045 inches ; at 9 p. m., 29.077 inches ; maximum, 29.265 inches, on the 17th ; minimum, 28.833 inches, on the 15th ; monthly range, 0.432 inch.

Relative Humidity—Mean for the month, 72.9 ; at 7 a. m., 81 ; at 2 p. m., 59.8 ; at 9 p. m., 77.9 ; greatest, 97, on 24th ; least, 40, on 21st. There was no fog.

The following table furnishes a comparison with the 17 preceding Julys :

July.	Mean Temperature	Max. Temperature	Min. Temperature	Hot Days.	Rainy Days.	Rain—inches	Thunder Storms.	Mean Cloudiness.	Humidity.	Number of Fogs.	Miles of Wind.	Mean Barometer.	Max. Barometer.	Min. Barometer.
1868	85.90	101.0	70.0	26	4	4.05	4	45.96	..	0	.....	... ..	.....	.....
1869	75.22	93.0	47.0	6	11	5.05	7	53.33	84.5	2	.....	29.073	29.284	28.777
1870	80.27	99.0	55.0	22	12	5.58	4	30.64	64.2	2	.....	29.058	29.252	28.813
1871	80.28	103.0	60.0	17	13	7.30	6	49.79	....	0	.....	.....	.....	.....
1872	77.96	93.5	61.5	11	13	6.50	9	50.86	75.2	2	9,203	29.061	29.283	28.772
1873	77.90	97.0	62.5	12	6	2.38	2	30.54	64.3	1	9,952	29.083	29.353	28.699
1874	83.62	103.0	68.0	21	5	1.19	4	26.88	52.1	0	10,904	29.079	29.256	28.765
1875	76.63	97.5	65.0	8	13	6.60	5	54.30	73.0	0	8,458	29.070	29.383	28.877
1876	78.60	95.0	60.0	12	6	3.51	3	30.48	72.7	0	8,901	29.075	29.268	28.817
1877	75.13	99.0	54.0	8	11	5.76	8	32.04	73.4	0	8,355	29.091	29.355	28.865
1878	78.40	98.0	58.0	15	7	4.30	4	31.29	78.2	0	7,974	29.073	29.265	28.739
1879	79.14	97.5	62.5	16	9	3.66	4	34.90	73.8	1	6,980	29.040	29.219	28.884
1880	75.75	98.0	54.0	13	8	2.34	5	28.28	68.3	0	9,312	29.106	29 335	28.926
1881	79.74	102.0	57.5	18	6	2.28	2	26.23	72.5	1	7,541	29.098	29.314	28.761
1882	72.05	99.0	52.0	11	9	4.03	3	38.92	75.0	0	7,464	29.122	29.410	28.893
1883	76.18	96.5	56.0	17	10	7.23	5	39.46	71.4	0	10,901	29.086	29.381	28.679
1884	76.93	98.0	60.5	10	15	5.18	5	41.67	71.7	1	8,733	29.004	29.289	28.809
1885	77.06	96.0	56.0	17	13	6.03	5	43.76	72.9	0	8,422	29.065	29.265	28.873
Mean	78.15	98.1	58.8	15	10	4.61	5	38.30	72.7	1	8,793	29.074	29.307	28.807

EDITORIAL CABINET.

ELECTRIC MOTORS FOR STREET CARS.

In the progress of electrical mechanics we have at length reached a point where the predictions of Prof. Joseph Henry, made fifty years ago, are in a fair way to be realized. We are constantly hearing of new contrivances for moving machinery and conveyances by electricity, and, while the most of these have not proved practicable, yet, the promise of ultimate success has been always hopeful. Among the new candidates for public interest the "Henry Electric Railway system" presents, perhaps, the most practicable scheme yet devised for moving cars by electricity. It is the invention of Mr. John C. Henry, a citizen of Kansas City and already favorably known among inventors by his Velocimeter and Fire and Police alarm. If the experiments thus far made are any index of the success of the invention, we may feel assured that the question (a difficult one for Kansas City) of rapid transit is practically solved.

We have been in the habit of abusing the operators of street-car franchises in Kansas City very virulently, for some time past, for the shabby cars, the ratlike mules and the slow pace so characteristic of the lines heretofore operated here. In many respects this abuse was merited; but in others it was unjust. In building the earliest, as well as the latest lines here, the one great obstacle to overcome has been the grades. So long as the motive power was confined to draught animals, the cars had to be reduced in size to reduce their weight. This necessitated a narrow track and a narrow track necessitated small teams. Two moderately sized horses cannot walk abreast on a narrow gauge track; and as small mules are in every way preferable to ponies as draught animals, it is attributable to these facts, as much as to any want of enterprise in Corrigan or other managers, that our service has appeared so contemptible.

Our grades, then, being the cause of past inefficiency in street-car facilities, we should encourage in every possible way the introduction of systems which overcome the difficulties they present. That they can be overcome has been very thoroughly proven by the success of the Cable Railway, which is operated over the most trying route in the city. There would be little necessity for anything better than this if it were not for two important factors in operating it: (1) it is an extremely costly road to build; and (2) the running expenses are very heavy compared with other systems. These facts would prevent the extension of the system over all the street-car lines of Kansas City for many years, at least; and in the mean time with what shall our present miserable facilities be replaced?

According to a report of Mr. Henry, to the company formed to exploit his invention, it appears that the experiments already made show the feasibility of his invention, even over streets so

rough as those of Kansas City. The plant used by him is a car fitted with a ten-horse Vandepoele motor, a twenty-horse Vandepoele generator and a twenty-five-horse stationary engine. The track is about one-third of a mile in length and includes a seven per cent grade on a very difficult curve. It is an ordinary street-car track and very rough and presents, among other difficulties, a switch so poorly constructed that the utmost care must be used to prevent derailment in crossing it. Notwithstanding these difficulties a speed of fifteen miles per hour on levels has been obtained, and eleven on a four per cent up grade. It is contended that, with the power now used, four similar cars can be operated as well as one, as the invention includes a contrivance by which all cars descending grades generate, instead of consume, electricity, and thus help those ascending and on levels.

If these claims are justified by the facts, there will soon be no excuse for retaining our present mule cars with all their vexatious incidents; and it will add immensely to the beauty and reputation of Kansas City when they are gone.

SCIENCE AND THE PUBLIC.

It is a mistaken opinion, but a current one, that science, as a study, has no practical value to man beyond the mere mechanical and industrial wants it ministers to. A scientist may be a "crank" and yet the two terms not be synonymous. It is true there are many branches of science which seem to possess neither interest or utility in the every-day affairs of life; but if we give them even a casual study it will be apparent that there is nothing in science "caviare to the general." The utility of the mathematical sciences is unquestioned by all, and even many of the natural sciences like geology, botany, physiology, etc., etc., are taught in our common schools from a general recognition of their value. But beyond these, in those obscure and difficult paths which lie apart from life's immediate necessities and gratifications, there are utilitarian objects concealed which can only be discovered and appropriated to the use of man by some devoted "crank" who is content to labor for the mere love of it. In archæology, for instance, beyond the artistic side of it, there seems to the average man to be no content except food for curiosity. Yet all will acknowledge the uses of history in the study of social questions, and ancient history, as we read it in this century, is largly composed of facts drawn from archæology. No student of to-day, unless he has matriculated in some cloistered academy where modern progress has never penetrated, pays much heed to the legends, except as legends, which, not many years since, made up the staple of history. Why is this? Simply because a class of savants, residuary legatees of the old antiquaries, have not been prevented by public ridicule and misapprehension from doing the work which brought this about. In Missouri a few years ago, we had a state entomologist whose devotion to his duties and intelligence in performing them were matter of comment wherever known. This was the eminent entomologist, Prof. C. V. Riley, whose genius and knowledge has since been

so well recognized all over the world. Now instead of retaining this man of science to help the farmer in the fight with insect foes of his industry, the cry of "bug-catcher" was raised against him in a bouffe Legislature and the office was abolished. Yet what cultivated man doubts to-day the practical nature of entomological science.

Even as to those scientific studies which children are allowed to mingle with the bable of dead languages in our high schools, no encouragement is given them by parents to retain and use what they were taught. A popular scientific periodical would be read by most young men and women with as much interest as a literary magazine, and with infinitely more profit.

The signs of the times are strongly predictive of a change in popular feeling on this subject; and such a change means a wider and more utilitarian culture for the coming man. He must be able to do more than quote Greek hexameters or spout Cicero. Education will mean, not memorizing antiquated ideas or crowding the mental apparatus with worthless rubbish, but an acquaintance with nature and nature's methods. It is only by means of such an education that man, as recipient of nature's bounty, is rendered capable of taking all that the universal mother offers her children.

GENERAL GRANT.

The REVIEW desires to testify its sincere participation in the national grief over the death of a great American. Now that he has joined the "silent majority" we can appreciate the character of the soldier and statesman, who was so honored and so maligned during his life-time. That this character was one which won upon the whole people, through all attacks of slander and malevolence, is made evident by the universal voice of a mourning nation. His elegy need not be written now. The pages of history and the hearts of fifty million people will preserve his memory better than the chime of rhyme and grace of oratory. In spite of partisan license and personal enmities, the Republic has not been ungrateful to Grant. He who walks far above his fellow-men is too fair a mark to pass scathless through his career; and Grant was no exception to the common lot. Yet the people will always see justice done to their servants and they were true to the great General.

He will live as the hero, not alone of this Nation, but of the world. No Roman Consul or Emperor ever gained a triumph such as was bestowed upon Grant during his tour around the world. Europe, Asia, Africa, as well as America, raised monuments to his memory in their annals for the year 1879.

But this universal recognition of our great countryman was not mere hero-worship—not the apotheois of deeds as represented by their accomplisher. The personality of Grant is a living factor in his reputation over and above his achievements. All who had the privilege of seeing him during life can understand what is meant by "individuality." It was the individual who gained the world's respect and love; it was the succesful leader of armies, the President of the Republic, who received the din and uproar of its plaudits and laudation.

It is hoped that the rather careless typography of the Review this month, will be forgiven by an indulgent public. The "devil" must have read the proofs instead of the proof-reader.

The plan of placing the names of contributors in the Table of Contents, alone, has been adopted by the Review. If there is objection to this course, the Editors are amenable to reason.

We ask our friends to aid us in increasing our subscription list. We are trying to give a full equivalent for the subscription price, but it is obvious that every increase in the number of our patrons will add to our resources, and help us that much to increase the interest and value of the Review.

Subscribers for the Review who take other periodicals, would do well to take them through this office. We have made such arrangements with the publishers of several Magazines, that we are able to offer very desirable inducements to our patrons. Please correspond with us on the subject.

The present volume (IX) of the Review will close with the December number. This will give but five numbers to the volume, but as these numbers will be larger than usual, our subscribers will lose nothing, even if we ask the full subscription price. We have determined, however, to fill out this volume for $1.00,—that is the five numbers, from August to December, inclusive, will be sent to subscribers for that price.

The attention of the public is directed to the value of the Review as an advertising medium. Its patrons comprise a large proportion of the most substantial, intelligent and energetic people of the entire west, as well as of Kansas City and vicinity. Among them are included school-teachers and other educators, men of science, business men, lawyers, doctors, clergymen, inventors, mechanics, etc., in fact the very best classes of the community. Our rates are very reasonable, and will be sent to anyone desiring to know them.

CORRESPONDENCE.

SCIENCE VS PHRENOLOGY.

MR. EDITOR:—Sometime in February last, I read a paper before the Kansas City Academy of Science, entitled the "New Phrenology." It was a popular title, and I was somewhat ashamed of it, inasmuch as it took an old name, which has covered much pretense and error, and applied it into what we hope may grow into a science. I passed over the phrenological part as lightly as possible, under the circumstances, for I was aware that its pretensions have little recognition in scientific circles and to repeat them was much like making a crusade against the dead. It seems, however, that what little I did say found two critics, in the Phrenological Journal. One of them, a certain I. P. Noyes, complains in peculiar english, because the article was "weak." For his sake I am sorry that I did not make it stronger. That I advanced some "great truths" I think must be acknowledged even by the gentleman himself; that they were my own discoveries I did not pretend. The Rev. Sam. Jones says: "If you throw a stone into a crowd and some dog runs off howling, it's generally a sign that he's hit" To this I would add, that he generally howls because the stone that hit him was not harder and heavier. In the July number is another article entitled "Critical without Knowledge." Since this appears in the editorial department, I presume that it was written by the editor himself. He does not impute "unworthy motives" to me. His chief object in calling attention to me is for the purpose of showing how intelligent men, students of medicine, will make erroneous declarations, simply because of their ignorance of the subject they presume to criticize." Since he has made the issue one between "unworthy motives and ignorance." I am glad to find that he has shown on which side the ignorance lies. The sentence in question is this: "Memory we now know is no special, localized organ or power. Phrenologists placed this, if I remember rightly, somewhere in the middle of the forehead, where the two tables of the skull separate and leave a cavity between them called the frontel sinus." To this the editor comments, "it is evident enough to every one conversant with the philosphy of the subject that the writer indicates sheer ignorance of its rudimentary principles. The fact is that the idea of memory having no special organ or seat as a separate entity in the brain was early taught by phrenologists."

There is a little book called the "Practical Phrenologist, &c., by O. S. Fowler," which contains on nearly its first page a chart of the so-called faculties. On this chart the region in question is covered by "Eventuality." Underneath, eventuality is defined as "memory of facts, events, &c." This is pure memory then,—as nearly as it can be defined, and in accepting Mr. Fowler as the best living phrenological authority, I have shown my ignorance. I was aware at the time I wrote the

above lines, that Dr. Caldwell, the earliest and strongest advocate of phrenology that this country has produced, advocated the non-localization of memory in an article published in the Transylvania Medical Journal, forty years ago. In prefering Mr. Fowler however, I was simply trying to give the latest knowledge upon the subject, and so fell into error. In Mr. Fowler's book, on page 251, where eventuality is further explained, the comment after "very small" is, "Forget almost everything." No further comment is needed here, and it fully explains the reason of my ignorance; but how is it with unworthiness of motive, when Phrenologists say one thing publicly in one place and attack a person for repeating it in another!

I am afraid, Mr. Editor, that I shall trespass too much upon your space, but there is another point on which I wish to speak. That is in regard to Mr. Fowler's idea of the nature of knowledge. He made no objection to my phraseology, when I called memory "the store-house, the arsenal of the mind." "Every intellectual organ has the property of memory; its special impressions are gathered and garnered." This may be a loose way of speaking, like some of the rest of his utterances, matters for later interpretation, but certainly he must be aware of the fact that knowledge is only a modification of brain substance in accordance with outward impressions, and there can be no such garnering process as he mentions. If such ideas as these are the logical outcome of Gall and Spurzheim's teachings, they certainly have not advanced science much. I think however that I gave Spurzheim full credit in the paper before mentioned, for what he did.

Respectfully,

J. B. Browning, M. D.

THE ANATHEMA OF SCIENCE.

Mr. Editor: It has become so thoroughly settled, as orthodox scientific doctrine, that psychology is merely a branch of physiology that it is somewhat perilous to risk one's reputation by paying much heed to the claims of animistic theorists and experimenters. Prof. Elliott Coues, the author of "Biogen," and, since, a well known theosophist, has felt the full force of the above remark in the treatment he has received from scientific men; and Prof. Crookes, A. R. Wallace, Prof. Zollner and Robert Dale Owen suffered in the same cause.

Now it is rather questionable whether science is the gainer by this policy of ex-communication; whether materialistic theorists and experimenters are loyal to science in looking at but one side of the shield which nature sets up for their inspection. It must be remembered that little of the physical progress of modern times is the result of conscious deductions from approved principles—that accident, rather than reason, gave us the vantages from which we have progressed to our present advanced position in physical knowledge. Chemistry is the off-spring of Alchemy and Astrology was the parent of Astronomy. Yet in neither of the modern sciences is there retained a single incentive that moved the votaries of their prototypes to unremitting toil and study. Out of the vagaries which prompted the cultivation of

these ancient mysteries, true science founded a correct knowledge of chemical processes and astronomical laws. Of all the great discoveries in science and the mechanic arts that have blessed our age, how few can be enumerated which were the result of constructive invention! A lazy boy invented the automatic valve-movement of the steam engine, without a thought of benefiting mankind; gunpowder was the discovery of a monk who sought the philosopher's stone; and thousands of similar instances could be adduced. Even the discovery of the New World was fortuitous,—indeed the discoverer lived and died in the belief that he had simply found a new and shorter route to India.

Acknowledged leaders of scientific opinion, such as Professors Tyndall and Huxley, have been requested on several occasions to investigate alleged phenomena claimed to be subversive of known laws of nature; but they have generally refused with the statement that such investigations possessed no interest for them. And recently a member of the London Society for Psychical Research was told by Helmboltz that he would not believe in the results of the Society's experiments if he should see them performed himself. This is not the scientific spirit. If all savants were of like opinion the whole field of alleged supernatural phenomena would be left to either shrewd imposture or credulous ignorance. If the phenomena is imaginary, the result of subjective conditions not objective impressions, it will require a trained scientific student to find the thread of the tangled skein of circumstance. If the phenomena are genuine, then it will require a hierophant of the same character to harmonize them with natural laws and destroy the germs of superstition. This work has been attempted with honest enthusiasm by Beard, in this country, and Carpenter, in England, with gratifying results; but the subject is still left in a most chaotic state so far as true science is concerned. Their experiments and inductions do not fit the many cases of "thought transference" reported by either the London or the American Society for psychical research. If there is a possibility of transferring our cerebral impressions to the consciousness of another without audible, visible or tangible speech, it is within the domain of science to discover and make it known; if the whole matter is a delusion, the world should be assured of it, not by a dogma of science, but by the overwhelming refutation of experiment. It may be that even the unclean mystery of spiritism may conceal a science as important to mankind as either chemistry or astronomy. W.

ITEMS FROM PERIODICALS.

MENTAL ODDITIES OF GREAT PEOPLE.

The lowest grade of mental disturbance is seen in that temporary appearance of irrationality which comes from an extreme state of "abstraction" or absence of mind. To the vulgar, as already hinted, all intense preoccupation with ideas, by calling off the attention from outer things and giving a dream-like appearance to the mental state, is apt to appear symptomatic of "queerness" in the head. But, in order that it may find a place among distinctly abnormal features, this absence of mind must attain a certain depth and persistence. The ancient story of Archimedes, and the amusing anecdotes of Newton's fits, if authentic, might be said perhaps to illustrate the border-line between a normal and an abnormal condition of mind. A more distinctly pathological case is that of Beethoven, who could not be made to understand why his standing in his night attire at an open window should attract the irreverent notice of the street boys. For in this case we have a temporary incapacity to perceive exterior objects and their relations; and a deeper incapacity of a like nature clearly shows itself in poor Johnsons standing before the town clock vainly trying to make out the hour.

This same aloofness of mind from the external world betrays itself in many of the eccentric habits attributed to men and women of genius. Here, again, Johnson serves as a good instance. His inconvenient habit of suddenly breaking out with scraps of the Lord's Prayer in a fashionable assembly marks a distinctly dangerous drifting away of the inner life from the firm anchorage of external fact.

In the cases just considered we have to do with a kind of mental blindness to outer circumstances. A further advance along the line of intellectual degeneration is seen in the persistence of vivid ideas, commonly anticipations of evil of some kind, which have no basis in external reality. Johnson's dislike to particular alleys in his London walks, and Madam de Stael's bizarre idea that she would suffer from cold when buried, may be taken as examples of these painful delusions or "idees fixes." A more serious stage of such delusions is seen in the case of Pascal, who is said to have been haunted by the fear of a gulf yawning just in front of him, which sometimes became so overmastering that he had to be fastened by a chain to keep him from leaping forward.—From "Genius and Insanity" by JAMES SULLY, in Popular Science Monthly for August.

COAL USED BY THE ANCIENTS.

We have received from the Rev. Joseph Hurst, of Wadhurst, England, a pamphlet copy of his very interesting address read at the meeting of the Royal Archæological Institute of Great Britian and Ireland, at Newcastle, on August 6, 1884, the subject being the mining operations of the ancient Romans. We are unable to lay this address before our readers, but we cannot omit a reference to a most curious part of it. The use of coal (pit-coal, or bituminous coal,) by the Romans during their occupation of Britain, which terminated in the year 311, is well authenticated, but that either the Romans, the Greeks, or any other ancient nations used coal prior to the period mentioned, or prior to the Christian era, has not, we believe, been so well settled. The author of the address before us throws much light on this interesting problem. He says: "That the ancient Greeks were acquainted with stone coal is evident from the words of Theophrastus, an author who lived three hundred years before Christ (de lapidibus No 16): 'The coal commonly so-called, which is dug out of the earth for man's use, is of an earthy (or stony) nature; it is kindled and burned like coal (charcoal). Of this (stone) coal workers in iron make use.' Solinus has also

been quoted for the use of stone coal among the Greeks, and if the red-hot stones which, according to Pliny, were used by the Gauls for smelting copper, were nothing more than stone coal, their efficacy would perhaps be rendered more intelligible to modern men of science." This reference to Pliny will be found in H. N. xxxiv, 20. Mr. Hurst's quotation from Theophrastus does not tell us in what country the coal referred to was found.

There is some other testimony to sustain Mr. Hurst's statements. In Johnson's Cyclopædia Mr. John B. Pearse, the compiler of the paper on iron, says of the Chalybes, who inhabited a part of the Asiatic country south of the Black Sea, that they "first used coal." He fortifies this statement in the following words: "Their iron was made, according to Aristotle (322) B. C.,) from sand ore dug from river banks, washed, and put into the furnace along with the stone pyrimachus, (fire-maker,) that is, coal." There is coal on the southern shores of the Black Sea, between the ports Heraclea and Bordin, which is now mined in considerable quantities, and it is probable that, if Mr. Pearse's inference from the statement of Aristotle is correct, the Chalybes obtained their supply from this source.—Bulletin of Iron and Steel Association.

TO CLEAN MARBLE.

Brush the dust off with a piece of Chamois, then apply with a brush a good coat of gum arabic, about the consistency of thick mucilage: expose it to the sun or wind to dry. In a short time it will peel off, wash it with clean water and a clean cloth. If the first application does not have the desired effect it should be tried again. Another method is to rub the marble with the following solution: One-quarter of a pound of soft soap, one-quarter of a pound of whiting, and one ounce of soda, and a piece of stone-blue the size of a walnut; rub it over the marble with a piece of flannel, and leave it it on for twenty-four hours, then wash it off with clean water, and polish the marble with a piece of flannel or an old piece of felt; or take two parts of common soda, one part of pumice-stone, and one part of finely-powdered chalk, sift it through a fine sieve and mix it with water, then rub it well over the marble, and afterward wash the marble with soap and water. To take stains out white marble, take one ounce of ox-gall, one gill of lye, one and a half table-spoonfulls of turpentine; mix and make into a paste with pipe-clay; put on the paste over the stain and let it remain for several days. To remove oil stains, apply common clay saturated with benzine. If the grease has remained in long, the polish will be injured, but the stain will be removed. Iron-mould or ink spots may be taken out in the following manner: Take half an ounce of butter of antimony and one ounce of oxalic acid, and dissolve them in one pint of rain water; add enough flour to bring the mixture to a proper consistency. Lay it evenly on the stained part with a brush, and after it has remained for a few days, wash it off, and repeat the process if the stain be not wholly removed.—Journal of Commerce.

GOING UP THE INDIANAPOLIS ELECTRIC TOWER.

Last week a number of persons took the elevator and mounted to the basket at the top of the electric light tower in Circle Park, Indianapolis. Among these were Harvey Bates, J. C. McCutcheon, Philip Igoe, and Arthur Edmunds. Mr. McCutcheon, in going up, took with him a thirty-five dollar field-glass, intending to indulge in a view of the city from the giddy height. In ascending, he forgot to take his foot off the brake, and when he got to the top his head struck with such force that he thought his nose and chin had telescoped, and the field glass fell to the ground, where it was broken into pieces so fine that a 500 diameter microscope would not have been equal to the task of finding the pieces. Arthur Edmunds was the only one of the party who had sufficient hardihood to mount into the basket, and Joe Elliott, as a spectator, was much disturbed at the deficiency in nerve that was thus exhibited. "When I was a boy," said Mr. Elliott, "I was a great climber. There was not anything I

was afraid to tackle. I have climbed shellbark hickories more than ninety feet high."

This famous climber was easily induced to get into the elevator, but as he mounted upward he began to complain. He said his feet ached. It had been so long since he had had them such a distance from the ground that they grew dizzy, and so he came down again.

As he stepped on terra firma a ribald newsboy yelled out, "Say, mister, where is that old hickory nut nerve o' your'n, anyway?"

The men who have the tower in charge are very accommodating, and a large number of gentlemen have taken advantage of the opportunity to view the city.—Electric Review.

WHY THE SWISS CAN DRINK SO MUCH.

Owing to the small proportion of moisture in mountain air and the low barometric pressure, evaporation is very rapid. Even afer the heaviest rain the ground dries in a few hours. This quality of the air tends to make perspiration more profuse and the skin dry faster than is the case at lower elevation. There is greater thirst, the tissues waste faster, and a high authority has said that a man's tissue is the only thing which it is his duty to waste, new tissue being out of all comparison better than old.

It is probable to this rapid evaporation at great heights and the thirst which it engenders that the Swiss have to thank for their wonderful drinking powers. The other week the marksmen of Canton Vaud held their annual rifle meeting at Payerne, a picturesque village on the Broye, and the local papers mention with something like pride that the shooters and their friends drank the place dry.

Everybody who has been in the highlands of Scotland, or any other mountain land, and tried the experiment, knows that he can drink with impunity much more whiskey, or whatever the vin du pays may be, than he can drink at home. This, it may be as well to observe, is mentioned as a dry fact, not as an additional reason for going to the mountains.—London Times.

A QUEER SUPERSTITION.

Abram Reed, a farmer living in Beaver township, Pennsylvania, cut down a large oak tree on his farm, and in cutting it up he found, embedded in the trunk, seven or eight feet from the ground, a small glass bottle and what had the appearance of a lock of hair. The bottle had been inserted in a hole in the tree made by an auger, then a pine plug was driven into the hole over the bottle, the hair also being held in the hole by the plug. The bottle was corked, and contained a colorless liquid. Over the plug had grown six solid rings of wood, besides a thick bark. There was a superstition among the early settlers, and it is held by many of their descendants that asthma and other affections could be cured by the victim standing against the tree and having a lock of his hair plugged in it while the hair was still attached to his head. It must then be cut off close to his head, and the afflicted person walk away without looking at it or ever passing by the tree again. While the use of a bottle was not included in this treatment, it is believed that the one with the hair discovered in the heart of the oak tree was put there in the early days of the settlement by some believer in the superstition to cure an ailment of some kind.—Lumber World.

MISCELLANY.

SURGICAL EXPLOITS—WHAT IS DONE IN THE AMPHITHEATERS OF THE MEDICAL SCHOOLS.

You have already read about the curiously successful surgery which a girl of this city underwent, writes the New York correspondent of the Chicago Journal. Having lost a section of the principal muscle from one arm, and being thus incapacitated for work, the surgeons of Bellevue hospital inserted the lacking material from a Newfoundland dog, patched up the wound, made it heal, and finally restored the arm to usefulness. The girl was under ether while the operation was going on, and a knowledge of its nature was kept from her until a cure was complete. The particulars were given to the reporters, and she got the news simultaneously with the rest of the public.

"You ask me what is, or what may be, the effect on the imagination of the girl?" said the surgeon with whom I talked. "Well, she happens to possess strong nerves and general good health. She seemed a litle shocked on learning there was a canine annex to her arm, and she was anxious right off, to know what sort of a dog had contributed the material. He had been killed immediately after the operation, because it would have left him badly maimed. She said she was sorry for that, as she would like to have had him to keep. She was delighted to be told that he was a fine specimen of his she'd never, never had forgiven us if we had used a Spitz, or a bulldog, or any ugly brute. A fashionable pug might have pleased her, yet on the whole she thought she would have chosen a Newfoundland if the selection had been left to her.

"She is a laundry girl, and probably not given to the consideration of fine mental or physiological theories, and so it is left to you professional writers to speculate on the effects of the amalgamation. There are persons so finicky that, everytime they coughed after a piece of dog had been engrafted into them, they would imagine that they were barking; and death by imaginary hydrophobia would be a possibility, but in this case I don't anticipate any trouble of that sort.

If Annie Pennell had died from the failure of the dog's flesh to heal with her own, no mention would ever have been made in print of the dangerous experiment. Only the surgical successes are given to the world, the failures are suppressed. Nothing was known by the newspapers of this case until two weeks after the operation when the arm was restored to its original value. That very many exploits in surgery come to deadly ends cannot be doubted. They are performed in the center of a small amphitheater where the students of one or another of the medical schools meet on appointed days to be practically instructed, and the surgeons lecture explanatorily as they work, telling what they are doing and the ex-

pected results.

"If there is a success," says a student to me, "the patient is usually exhibited to us again, to the glory of the operator; but many and many a case is never seen or mentioned in a clinic afterward, and the supposition is that deformity or death has been caused. The subjects are usually poor persons—gratis patients in the hospitals—and the surgery on them is largely in the nature of vivisection. That is, they are made to stand the risk of experiments which may and may not turn out well.

"If Gen. Grant had been an unknown patient in a public hospital, there would have been a knife in his throat ere this; and he might have gained by it, too; but surgical experiments, mind you, are not tried on illustrious persons. Naturally the surgeon makes his novel and perilous feats under circumstances which will hide his failure. I am not blaming him, either; and it is a fact that about all the progress in both medicine and surgery is achieved through tests of theories in the hospitals. The subjects are usually in a hopeless condition; they do not dread the ordeal, for its nature is not explained to them; and often they are restored to health, besides contributing to the stock of science."—Ex.

GEARING FOR MOTOR CARS.

An English inventor of electrical motor cars in presenting his claims to an Electrical Society, laid great stress on his contrivance for reducing speed. It is known that the helix of a motor makes from eight hundred to one thousand revolutions per minute. Of course this rapidity of movement cannot be applied directly to the axle, as the speed, in that case, to say the least, would depend upon the resistance to be overcome and would have no regularity. The English invention consists of a "worm," revolving in oil, which reduces the motion, while communicating it to the axle, to about one in twelve. Mr. Henry, of this city, has devised gearing, which not only reduces the number of revolutions, but puts it in the power of the driver to run at any exact rate of speed desirable over gradients and levels alike. This, too, without loss of power—power and speed being interchangeable. This contrivance is a part of his system of electric appliances for moving street cars.

THE SENSE OF TASTE AND SMELL.

How much of the pleasure of living comes from the exercise of the little considered sense of taste or that of smell it is hard to estimate. Harriet Martineau, the English authoress, seems to have been one of the few persons having no sense of taste, as a recent writer asserts that she was entirely destitute of it. She reported that the faculty came to her once, when the deliciousness of a leg of mutton aroused an eager anticipation of the enjoyment of her next dinner; but nothing came of it, for her tasting power was withdrawn as hastily as it had been given. The sense of smell was also denied her, as it was Wordsworth. In his case the lacking sense also appeared on a single occasion, when he "smelled a beanfield and thought it heaven."—Ex.

SONOROUS BEACH SANDS.

According to late papers by Profs. Julien and Bolton, sonorous beach sands are far from being the rarities they were considered some years ago, as they are already found in seventy-four American and thirteen foreign localities, and the number is constantly increasing. When suddenly compressed between the hands, musical notes are emitted by these sands, the pitch rising as the quantity is diminished. The loudest sound may be made by suddenly bringing together two divided portions of sand enclosed in a bag. Prof. Julien considers that the conditions of sonorousness are perfect dryness, uniformity of grain ranging from about one-tenth to one-fifth of an inch in diameter, and freedom from dust. He thinks that any sand satisfying these conditions may be musical. When wet, sonorous sands generally become quicksands.

STORAGE BATTERIES.

Some of our electrical exchanges are quite enthusiastic over the success of the new Bouer storage cells, in driving motors for street cars. The great obstacle to be overcome in the use of storage cells are (1) irregularity of current; (2) the space required for placing them, and (3) the great additional weight they give to the car. Notwithstanding the great confidence expressed over the recent experiments with storage cells in England and on the Union Railway, Baltimore, the results, as to speed and economy are largely with the Henry conductor system of Kansas City.

THOUGHT TRANSFERENCE.

The American society for physical research, of Boston, has recently, through its committee on thought-transference, been engaged in a series of experiments similar to those of the English association which have attracted so much attention. The success of these experiments does not seem to have been so remarkable as those performed across the water, yet the results are rather confusing to any one who has heretofore been satisfied with the explanations of Beard and Carpenter.

OBITUARY.

Science has been recently deprived of some of its ablest votaries by the death of Rev. T. W. Webb, of Hereford, England, and Prof. Henle, of Gottingen, in May last, of Prof. Fleeming Jenkin, of the University of Edinburgh, in June, and of Lieut. Tilly, commander of one of the German West African exploring expeditions, Alex. Carroll, curator of the Smith Institute, Sterling, Scotland and Alex. Murray, late of the Canadian geological survey, all during the early part of the year.

AURORA BOREALIS.

Sophus Troucholt has exploited a new theory to account for the Aurora borealis. He holds the opinion that the fundamental phenomena is a ring of light encircling the Arctic regions, and that all the various forms obscured are due to modifications and imperfections in this ring.

NOTES.

Mr. O. Chanute, in his paper on the cost of railroad freight traffic, published in the Railway Review of May 2d and 9th. has made a timely contribution to the popular as well as the professional discussion of the railroad-rate problem. We think the whole history of the war of legislatures on the railroads show that what the people who influence the legislatures really want is justice. That they often try to force conditions that are not just, is true enough; but that is largely due to a general ignorance of the conditions which they endeavor to control. Nothing can be more wholesome than to discover and make known, not in misleading "averages," but in detail, the cost of the service rendered by railroads in moving each class of freight. Mr. Chanute suggests a practical formula by which this cost may be ascertained, and the values for which may be determined by each railroad company for its own special circumstances. For purposes of illustration, he applies his formula to approximately determined data on the New York Central; and the resulting tables show that the actual cost of handling and moving different classes of freight varies from 0.42 cent to 3.11 cents per ton per mile Westward, and from 0.37 cent to 9.55 cents per ton per mile Eastward.

With the probabilities strong that the cholera may reach the United States this year, it is essential that people should, above all other things, look well to the water they drink. Impure water provokes sickness and disease under the most favorable circumstances; but when contagious and deadly diseases are lurking around the danger is then all the greater, for bad water is a slow but sure poison. That much of our drinking water is vilely bad goes without saying. A very simple way to purify water is given by the State geologist of New Jersey, in the making of a cheap but excellent filter: It is the bottle filter, and is made by "tying a string wet with turpentine around the bottom of a quart bottle and breaking out the bottom. This is done by lighting the string, and, when the flame has encircled the bottle, dipping it in cold water. Layers of fine cotton batting must then be placed in the bottle until a wad is collected that rests on the shoulders of the bottle and over its neck. Now dissolve a cup of alum in hot water and pour the solution into a cup of cold water. This makes a filtering substance. I use alum because it is the only thing which will precipitate all impurities of the water to the bottom. For every gallon of water that is desired to purify, add a teaspoonful of the filtering fluid, and stir it until every particle of the animalcula is precipitated. This usually takes about five minutes. Then run your gallon of water thus treated through the filter, and you will have your water free from all impurities."

Colonel Prejwalski, the well-known Russian explorer of Central Asia, writes to the Geographical Society at home,

that he has discovered gold mines, worked by the natives of Thibet, so extensive that he ventures the opinion that this country will prove the equal of California in this precious mineral. Near the head of the Hoang-ho, on the southern slope of one of its tributaries, he came across some thirty Tawgots engaged in a rough sort of placer-mining, taking the gravel from a depth of only one or two feet, and yet, as a result of this ancient method of obtaining the gold, the natives had great quantities of the mineral in large pieces, none of them being smaller than a pea. Of course, civilized handling of the deposits would make such gravel pay enormously at small outlay, and the deposits are of the most extensive character, the whole northern part of Thibet being rich in such areas.

The Scotsman says: "Only a few years ago it was the height of rashness or of heroism, for an infidel to set foot in Mecca. Burkhardt and Burton won their spurs by venturing in the disguise of pilgrims, within the most sacred city of Islam. The telegraph has changed all that. Mecca, in spite of its triple protection of desert mountains, robber tribesmen and Mussulman fanaticism, is about to go down before the post of the telegraph constructor. In a few weeks the birthplace of the Prophet will be in direct communication with the newsmen of Fleet street, London. Messages will be sent and delivered within a stone's throw of the rock which fell from heaven to mark the site of Paradise and of the sacred well which has for so many centuries distributed religious influences and the germs of cholera morbus among the Faithful.

Dickens has been much criticised for his apparent acceptance of the fact of spontaneous combustion, but Sir William Gull lately testified to a surprising case before the committee of the house of lords on intemperance. A large, bloated man, who was suffering from difficulty of breathing and distension of the venous system, died at Gup's hospital. At the post-mortem of the following day there was no sign of decomposition, and the body was believed to be distended with gas. "When punctures were made into the skin," said Sir William, "and a lighted match applied the gas which escaped burned with the ordinary flame of carbureted hydrogen. As many as a dozen of these small flames were burning at the same time."

The wood of the jarrah tree of Australia is probably the most durable known. It is proof, says the Industrial American, against insects and exposure, and ships built of it have sailed twenty or thirty years without copper. It will not grow on good soil, only where there is ironstone. One of the most remarkable facts about this timber is that if a bolt is put into it when it is taken out, a bolt of precisely the same size will go into the hole again. The effect of the iron is apparently to preserve the timber, and of the timber to preserve the iron.

The deepest boring yet made is at the village of Schladebach, near the line between Leipzig and Corbetha. It has been made by the Prussian Government to test for the presence of coal and was bored with diamond drills. Its depth is 1,390 meters (4,560 ft.); its

breadth at the bottom, 48 millimeters; and at the top, 280 millimeters. It has occupied three years and a half to bore, and cost a little over £5,000. The temperature at the bottom is 48 degrees.

The decadence of the English coal fields is often made a matter of discussion on both sides of the Atlantic. The latest instance is a pamphlet just issued in Liverpool entitled "Warning from the British Coal Fields," in which the author advocates the formation of a national association for the purpose of inquiring into probability of their early exhaustation. He is of the opinion that, at the present rate of working, British coal will come to an end in 110 years.

An English journal, in reply, reminds the author that a royal commission of undoubted capability for the investigation, had looked into the whole matter and made a report in 1871, which gave nearly 450 years for the duration of the coal to the depth of 4,000 feet. In the zone exceeding that limit a quantity of coal which amounts to 48,465,000,000 tons, is believed to exist. That report was based upon the most careful and trustworthy information obtainable.

China, which only six years ago had but six miles of telegraph lines, has now completed a system to which Canton, the capital of Southern China, is brought into direct communication with the metropolis of the north. News from the principal cities can now reach London within four hours.

A recent discovery of mica, at Tallulah, Ga., is reckoned the richest in the world. It is said that blocks a foot square can be taken out, and that the supply is declared inexhaustible. There is such a demand for the mineral in stove making, that it has been growing scarce and dear for several years.

Japan already counts her telegraph stations by the hundred, and talks of running a wire to the sacred summit of Fusiyama for the purpose of telegraphing weather observations.

CURRENT LITERATURE.

NEW BOOKS.

"AN INGLORIOUS COLUMBUS."

AN INGLORIOUS COLUMBUS: OR, EVIDENCE THAT HWUI SHAN AND A PARTY OF BUDDHIST MONKS FROM AFGHANISTAN DISCOVERED AMERICA IN THE FIFTH CENTURY, A. D. By Edward P. Vining, New York, D. Appleton & Co., 1885. Price $4.

Those who have taken any interest in the battle of theories over the origin of pre-Columbian culture on this continent will recall the story, first set afloat by de Guignes, of the discovery of America by the Chinese. For a time this story was a very shuttle-cock kept dancing in the air by attacks and defenses from all quarters, but gradually it settled out of common view. Lately, however, the subject has been revived in a form which is likely to give it a significance in American history and ethnology not to be gainsaid. In the work of Mr. Vining the entire literature of the subject, both pro and con, seems to

have been conscientiously and intelligently presented. Beginning with the memoir of de Guignes and Klaproth's celebrated refutation, the reader is carried through the arguments of de Paravey, Neumann, Godron, d'Eichthol, Saint Martin, Adam, d'Hervey, Williams, Leland and others and assisted by references to Humbolt, Prescott, Bancroft (H. H.) and many other Americanists and Orientalists. Following this detailed bibliography of the subject, the author presents the story of Fusang as written in the Chinese annals. This is given in the original characters with eight translations by different hands. Having thus prepared the way the author launches forth an argument which is in many respects admirable and in not a few unanswera ble. The argument is too long to reproduce here, suffice it to say that most readers will be convinced by its perusal that a Buddhist priest. Hwui Shan, with a company of others, made a journey to a country called Fusang which was reached by a sea voyage on the Pacific some six or seven thousand miles in length. The entire voyage seems to have been along the coasts of the eastern and western continents, crossing from one to the other along the chain of islets which nearly fills the interval between Kamptchatka and Alaska. From Alaska the expedition coasted south as far as Central America and from thence returned to China with their tales of wonders.

Unlike the method pursued in many books of similar character the statements in Mr. Vining's work are carefully and conscientiously verified and his citations of authority are always respectable. There is no straining a point to make it fit his hypothesis; nor do we find that aggravating tendency, so common to authors with theories to uphold, of throwing, with the utmost complacency, the burden of proof on the negative. Throughout, his book is worthy of a respectful and attentive reading; and, even if the reader shall not be ready to subscribe to the theory advanced, he cannot help but rise from its perusal with a mind enriched from the immense store of information its pages contain.

Next month we will give a more extended review of the book and present an account of the expedition and its results on American aboriginal culture from Mr. Vining's stand-point.

ABRAHAM LINCOLN.

THE LIFE OF ABRAHAM LINCOLN. By Isaac N. Arnold, Author of the "Life of Benedict Arnold," &c.; Late President of the Chicago Historical Society; Member of Congress during the Civil War. Chicago, Jansen, McClurg & Co., 1885. Price, $2.50.

Most great men have been unhappy in their biographers. Indeed a good biography is as rare as a good novel. Yet there seems to be a theory extant that any one who can command a good vocabulary and a fair prosody has all the stock in trade necessary to delineate a character which was, perhaps, inscrutable, in some phases, to even those who had observed it longest and closest. There are many such "Lives" extant but they fail to

"remind us
We can make our lives sublime."

There are biographers and biographers. Some, like Carlyle, who invest

their heroes with the factitious grandeur of blood-curdling periods and thundering adjectives; with them the style is everything, the hero nothing. There are some, like Boswell, who act the part of Ganymede to their Jupiter; with them the hero is everything, the style nothing. Between these two extremes there are many gradations; but few are they who find the happy medium.

Among the few biographies of the day which bear marks of adequate genius in their authors, one of the best is the work of Mr. Isaac N. Arnold, noted above. Biography is not an untried field for him. He has already gained some laurels there in a most difficult role—that of apologist to American readers, of the treason of Benedict Arnold. It might be thought that such a labor would be incompatible with an attempt to place before us the true characteristics and motives of a heroic patriot; but it must be confessed that the Lincoln of Mr. Arnold is not only the real Lincoln but he is so placed before us that we feel and recognize, if never before, the gigantic figure he made in deciding the destinies of his country. There is brought back so vividly before our minds the strife, the confusion, the consternation, the warring policies, which beat around the President in the dark days of the war, that, in the obscurity and the turmoil, the great Liberator alone seems to have retained the constancy, the firmness of purpose and policy, and the strength of patriotism to control the whirlwind and direct the storm.

There are few faults in the book of sufficient importance to point out. The author had barely prepared the MS. for the printer when he died; leaving the work of carrying it through the press to others. This has been well done. It is well worth a perusal even by those who are familiar with Lincoln's life and character.

FORESTRY.

FORESTS AND FORESTRY IN POLAND, LITHUANIA, THE UKRAINE AND THE BALTIC PROVINCES OF RUSSIA, WITH NOTICES OF THE EXPORT OF TIMBER FROM MENUL, DANTZIG AND RIGA. Compiled by John Croumbie Brown, L. L. D., &c., Edinburgh; Oliver & Boyd, London; Simpkin, Marshall & Co., Montreal; Dawson Brothers. 1885.

The subject of Forestry is of the utmost importance to a large portion of the west where the landscapes show only vast treeless prairies; yet it must be confessed that western enterprise has fallen behind the more conservative old world in sylviculture. In many of the countries of Europe, Forestry is taught as a profession, and schools are endowed by the Government for the purpose. In 1884 there was established at Edinburgh a National School of Forestry and a museum connected with it. Forest science being thus recognized, the making of books on the subject began. With characteristic pertinacity the canny Scotsmen set out to inform themselves about the Forestry of the world. Among the works produced, all by John C. Brown, were (1) Introduction to the Study of Modern Forest Economy; (2) the Forests of England, and the Management of them in By-gone Times; (3) Forestry of Norway; (4) Finland; its Forests and Forest Management; (5) Forest Lands and Forest-

ry of Northern Russia; (6) French Forest Ordinance of 1669; with Historical Sketch of Previous Treatment of Forests in France; (7) Pine Plantations on Sand Wastes in France; (8) Reboisement in France; or Records of the Replanting of the Alps, the Cevennes and the Pyrenees, with Trees, Herbage and Bush, with a view to arresting and preventing the destructive consequences of torrents; (9) Hydrology of South Africa; or Details of the former Hydrographic Condition of Cape of Good Hope, and of Causes of its Present Aridity, with suggestions of Appropriate Remedies for this Aridity; and several others. These brochures have been supplemented by two more pretentious works, one noted above, the other on "Forestry in the Mining Districts of the Ural Mountains in Eastern Russia."

These books have given their author an eminence in Forest science hardly attained by any other living person, and contain the most valuable hints and suggestions as well as information. These should be made applicable in some way to the great plains of Kansas, Colorado, Arizona and Nebraska.

THE WALUM OLUM.

The Lenape and Their Legends; With the complete Text and Symbols of the Walum Olum, a new translation, and an enquiry into its authenticity. By Daniel G. Brinton, M. D; D. G. Brinton, Philadelphia, 1885. Price, $3.00.

Dr. D. G. Brinton's latest contribution (No. V.) to the Library of Aboriginal American Literature is not less valuable than its predecessors. It gives many legends of the Lenapes and redeems from oblivion an aboriginal chronicle which has long been looked upon askance by Americanists and denounced, by not a few, as a forgery of the eccentric Rafinesque. While Dr. Brinton's critical sagacity has not established beyond any question the authenticity of the Walum Olum, he has given it a respectable standing and placed it in a position where it must, very shortly, be either thoroughly discountenanced or verified.

The chronicle in question, known as the Walum Olum, or Red Score, consists of a series of chants of the Delaware Indians, including a cosmogony and a history of their wars and migrations. It appears to have been first obtained in hieroglyphic, or pictographic form, by one Dr. Ward, in 1820 and two years afterwards the verses were written in the original language. Rafinesque first translated and published them in 1833; but he stood in such disrepute that no one would countenance what was thought to be a fraud. The actual document therefore, is not ancient; but Dr. Brinton finds good reason to believe that the chants themselves are of considerable antiquity. The pictographs may possibly be many years older than 1820 also, but there is no way of determining that now.

Scholars everywhere should vie with each other in encouraging this laudable enterprise of Dr. Brinton. There are many specimens of aboriginal literary skill extant, which should be included in this library, as they are almost inaccessible at present.

OTHER PUBLICATIONS RECEIVED.

The Sun. A familiar Description of His Phenomena. By the Rev. Thomas William Webb, M. A., F. R. A. S., etc. Industrial Publication Company, New York, 1885.

TRAINING-SCHOOLS FOR NURSES, with Notes on Twenty-two Schools. By W. G. Thompson, M. D. New York, G. P. Putnam's Sons, 1883.

ESSAYS, SPECULATIVE AND PRACTICAL. By Herbert Spencer. Humbolt Library. J. Fitzgerald, Publisher, New York, 1885. 15 cents.

LOCAL INSTITUTIONS OF MARYLAND. By Lewis W. Wilhelm, Ph. D. etc., Johns Hopkins' University Studies, Third Series. Baltimore; N. Murray, Publication Agent, Johns Hopkins' University, 1885.

THE LINEAL MEASURES OF THE SEMI-CIVILIZED NATIONS OF MEXICO AND CENTRAL AMERICA. By Daniel G. Brinton, M. D., Philadelphia.

REMARKS UPON CHIPPED STONE IMPLEMENTS, and the FIRST NOTICE OF THE PINE GROVE OR FOREST RIVER SHELL HEAP. By F. W. Putnam. Printed at the Salem Press; Salem, Mass., 1885.

AN ACCOUNT OF THE PROGRESS IN ANTHROPOLOGY IN THE YEAR 1884. By Prof. Otis T. Mason. Washington, Government Printing Office, 1885.

A DESCRIPTIVE CATALOGUE OF THE GRASSES OF THE UNITED STATES, etc. By Dr. George Vasey, Botanist of the Dep't of Agr., Washington, D. C. Washington, Gibson Brothers, 1885.

CERTITUDE, PROVIDENCE AND PRAYER. By James McCosh, D. D., L. L. D., etc. New York, Charles Scribner's Sons, 1883.

NOTES ON THE LITERATURE OF EXPLOSIVES, No. VIII. By Prof. Chas. E. Monroe, U. S. N. A.

THE PERIODICAL CICADA, etc. By Charles V. Riley, Ph. D. Washington, Government Printing Office, 1885.

BULLETIN OF THE PHILOSOPHICAL SOCIETY OF WASHINGTON, VOL. VII. Containing the Minutes of the Society and of the Mathematical Section for the year 1884. Washington, 1885.

BULLETIN OF THE BROOKVILLE SOCIETY OF NATURAL HISTORY, No. I. Richmond, Ind., J. M. Coe, 1885.

RESEARCHES ON SOLAR HEAT and its Absorption by the Earth's Atmosphere. A Report of the Mount Whitney Expedition. Prepared under the Direction of Brig. and Bvt. Major General W. B. Hazen, Chief Signal Officer of the Army by S. P. Langley, Director of the Alleghany Observatory, with the Approval of its Trustees. Washington, Government Printing Office, 1884.

This is No. XV. of the Professional Papers of the Signal Service and not the least important of them. It is a very exhaustive treatise on Solar Heat and possesses an interest beyond that of the more technical generalizations of science. To the meteorologist at least, the whole subject is of the first importance, especially so in its relation to selective absorption of heat by our atmosphere. The experiments of the expedition in this direction are interesting, and were performed by making independent simultaneous observations on the summit and at the foot of Mt. Whitney, Cal. The subject is too involved for a mere notice, but for those who feel an interest in the subject the present volume will prove a vade mecum.

CAMP-FIRE, MEMORIAL, AND OTHER POEMS. By Kate Brownlee Sherwood. Chicago, Jansen, McClurg & Company, 1885.

Most of the verses in the volume before us are evidently the outgrowth of Grand Army meetings. Considerable skill in versifying is manifested by the author and her productions are always readable, especially by one who participated in the valorous scenes described, or who can reall in memory the feelings of war-time. It should have a good circulation among old soldiers.

REPORT OF HISTORICAL AND TECHNICAL INFORMATION RELATING TO THE PROBLEM OF INTEROCEANIC COMMUNICATION BY WAY OF THE AMERICAN ISTHMUS. By Lieut. John T. Sullivan, U. S. N. Bureau of Navigation, Navy Department. Washington, Government Printing Office, 1883.

The same motive which actuated the earliest discoverers and explorers of the American Isthmus in seeking, with such indefatigable toil, for a passage at that point connecting the Atlantic and Pacific, is stronger now, so far as the needs of commerce are concerned, than in their day. More than then commerce is tending west-ward and seeking the easiest and shortest path-ways. If Columbus or Pedrarias, or even Capt. John Smith on the Chickahominy, had found the "secret of the strait" it is quite doutful if the Suez canal had been built; and in that case the late important military events in the East might never have occured. But the "secret of the strait" was not discovered and it is left for the present generation to create a strait where none existed. This is rather God-like work but the men of the nineteenth century are truly a little higher than the angels in their powers over nature.

The book before us is a faithful and interesting statement of the various plans, ancient and modern, to make a practicable passage for ships over the Isthmus of Panama. It is accompanied by maps, plans and cuts, illustrating the subject fully, and is written in a readable, and, even, occasionally, a graphic style. A portion of the literary work is credited to Prof. Nourse but Leiut. Sullivan is entitled to full praise for carrying out the resolution of the Senate (upon which the book is based) in such a scholarly and intelligent manner.

We will, in a future number give an extended review of the book with the object of enlightening our readers on a subject now quite obscure to most of us.

PERIODICALS.

The contents of the August Magazine of American History are so varied and engaging that a brief summary gives no adequate notion of their importance and substantial worth. Any of its articles, except for the necessary sequence of arrangement, might be taken as leaders in point of excellence. It has four essays on the Civil War, of sterling merit, and an equal number on other historical topics of living interest. General Thomas Jordon's second paper on the "Beginnings of the Civil War in America," touches many controverted points in an able and fearless manner; Gen. Henry M. Cist writes a thrilling chapter on "Cincinnati with the War Fever, 1861;" Gen. John Cochrane discusses "The Charleston Convention," of which he was a member, showing its work and its results; the Editor in a personal sketch of "Major-General John A. Dix," describes the great Union Square War Meeting in New York, and the formation of the famous Union Defence Committee; Hon. James W. Gerard contributes a scholarly paper on the "Revocation of the Edict of Nantes," which so largely affected the population of America; Professor E. W. Gilliam, in "Presidential Elections Historically Considered," calls the attention of every voter in the land to the inconsistencies of the present electoral system, whereby the original text of the Constitution is inoperative; Ethelbert D. Warfield writes of "John Breckinridge, a Democrat of the Old Regime," unfolding some points in Kentucky history never before clearly defined. The frontispiece to this superb issue is an exquisite portrait in steel of Major-General John A. Dix. The pictures are by Theo. R. Davis, Harper & Brothers' famous War Artist, and the portraits of Jefferson Davis and his first Cabinet are given with much effect. The standing departments—Minor Topics, Original Documents, Notes, Queries, Replies, Societies, Bibliography of Historical Societies, and Book Notices—are admirably filled. Published at 30 Lafayette Place, New York City.

The Atlantic Monthly, for August, is a most enjoyable number. The story of the

Prophet of the Great Smoky Mountain ends most dramatically. We have in American fiction few stories more strange or successful than this or that have commanded more interest or attention. The story has been told in a fresh and delightful manner, and the life and character are unmistakably natural, though the reader may have no knowledge of them. The novelist has discarded the usual style of ending her story, and the close is both novel and satisfactory. If the story is published in book form, it should be in every house and library where a good story is welcomed. Charles Dudley Warner contributes another paper containing his experiences on horseback in the Carolina mountains. Oliver Wendell Holmes has further chapters of The New Portfolio, and Mrs. Oliphant's Country Gentlemen maintains its interest. E. R. Sill has an article on Should a College Educate, and P. Deming gives a very good short story on A Stranger in the City. James Russell Lowell and Oliver Wendell Holmes have each an Anniversary After Dinner Poem. There are a number of other very valuable papers. Published by Houghton, Mifflin & Co., Boston.

The July number of the Journal of Microscopy and Natural Science (quarterly) has been received, and is even more than usually interesting, containing articles on Cystopus or White Rust, accompanied by two lithograph plates showing the first appearance and gradual growth of the Cystopus and what plants are most generally affected; an interesting article on Mounting Beetles and other Insects without Pressure; What is a Plant? Chironomus Prassimus; Animal Metamorphosis, with plates; an instructive article on The Microscope and How to Use It; Diatoms in the Stomachs of Shell Fish and Crustacea; Structure of Diatoms; reviews, correspondence, and the usual number of current notes and memoranda. This journal is edited by Alfred Allen, secretary of the Postal Microscopic Society, at 1 Cambridge place, London, Eng., is issued quarterly, and is invaluable to a person studying nature in a scientific manner.

The North American Review for August, contains the following table of contents: Can Cholera be Averted? by John B. Hamilton, M. D., Supervising Surgeon-General of the Marine Hospital Service of the United States; John H. Rauch, M. D.; John C. Peters, M. D.; H. C. Wood, M. D., LL.D., and Charles A. Leale, M. D.; The Animal Soul, by Felix L. Oswald, M. D.; A Profane View of the Sanctum, by M. J. Savage; Temperance Reform Statistics, by Prof. Willis J. Beecher; The Price of Gas, by Charles Hull Botsford; The Spoliation of the Public Lands, by George W. Julian. The discussion of the cholera question is the most timely theme in the present number, and it is treated in a very lengthy and complete manner.

Van Nostrand's Engineering Magazine contains papers upon Engineering as a Profession, being an address to the Alumni Association of the Stevens Institute of Technology by William Kent, M. E.; Water Motors by Charles Andre, illustrated, and translated from the French for Van Nostrand's; Cable Tramways, by W. M. Colam; Tempered Glass, by Frederick Siemens; a continuaton of Samuel Baxter's paper the Treatment of Timber; Technical Education, by Cunynghame; The Protective Power of Armour Plates, as Proved in Actual Warfare; The Evolution of Machinery, by Prof. H. S. Hile Shaw; and Chimney Construction, by R. M., and F. J. Bancroft.

"Concerning the Suppressed Book" is the title of the first article in the Popular Science Monthly for August. It is by Prof. E. L. Youmans, and is an examination of the Spencer-Harrison correspondence, which is given in full, and which ended in destroying the new book on religion shortly after its issue by the Appletons. The writer makes a strong showing for the American side of the case, and gives the whole mater a very different aspect from that presented in the English papers.

Mr. James Sully, in "Genius and Insanity," treats of the nature of genius as displayed in the careers of several distinguished personages, and of its relation to the general mental integrity of the individual. Dr. Mary Putnam-Jacobi describes "An Experiment in Primary Education," made by herself on her own child, in which, substituting the study of things for that of words, she obtained some very striking results well worthy the attention of our educators. Sir John Lubbock's illustrated article "On Leaves," begun in the July, is completed in this number.

"The Future of National Banking" is the subject of an article by Mr. E. R. Leland, who discusses some of the more important methods that have been proposed as substitutes for our present system, which is destined to pass away with the extinction of the National debt. Sir Henry Thompson's article on "Diet in Relation to the Age and Activity," begun in a former number, is concluded, and is followed by an interesting and instructive paper by Mr. George P. Merrill on "The Building and Ornamental Stones of the United States.

The addresses of Professor Huxley and the Prince of Wales at the presentation of the Darwin Statute to the British Museum

are given, and there are also articles of much popular interest on "Measures of Vital Tenacity," by Dr. B. W. Richardson; Curiosities of Time-Reckoning," by M. L. Barre; and "Modern Bronzes," by Perry F. Nursey.

The sketch and portrait are of the distinguished French scientist, M. Michel Chevreul, who is now in the one hundredth year of his age, and still engaged in active scientific work. The "Editor's Table" and the other departments are characterized by their usual variety and interest.

Of all the periodicals which come to our table, none are more welcome than The American Naturalist. The contents of the July number keep up the established reputation of this Magazine. Among others the following papers are noticeable: "Evolution in the Vegetable Kingdom," by Lester F. Wood; "Ancient Rock Inscriptions on the Lake of the Woods," by A. C. Lawson; "Kitchen Garden Esculents of American Origin (Continued)," by Lewis Sturtevant; "The Relations of Mind and Matter (Continued)," by Charles Morris, etc.

The Journal of Science for July (formerly the Quarterly Journal of Science), London, is replete with interest and instruction. The first paper is a rather baffling contribution by the Count O. Reichenbach, on "Evolution as applied to the Chemical Elements." Other notable papers are "The Parasites of Civilization," and "Mr. A. R. Wallace, F. R. S., on the Relations between Spiritualism and Science," by R. M. N.; and "The Hereditary Transmissin of Stature to Female Descendants in Horses."

We find the reputation of the American Journal of Science well sustained by the July uumber. Some of the papers are: "Contributions to Meteorology" by Elias Loomis (with plate); "Cause of Irregularities in the action of Galvanic Batteries;" by Hays & Trowbridge; "Sensitive of the eye to Colors of a Low Degree of Saturation," etc.

The July number of "The Observatory, a Monthly Review of Astronomy," (London), sustains the past reputation of the Magazine. Among the notable articles it contains, may be mentioned "Photometric Observations of Ceres, Pallas and Vesta;" "Harvard College Observatory," and "On the Defining Power of Telescopes." The latter is by Prof. N. E. Green, and well worth a perusal by those interested in telescopy.

The American Monthly Microscopical Journal presents in its July number, the usual choice and timely contents. Among other articles are the following: "Opercularia Constricta, N. S. P., (Illustrated)." "The Microscopical Discrimination of Blood," and "Staining Tissues in Microscopy."

The Journal of Comparative Medicine and Surgery (Quarterly) for July contains the following among other papers: "Indigestion in the Horse," "Bacteria Culture" and "The History of Tuberculosis."

In the July number of the Journal of the Franklin Institute, there is no lack of food for the intellect. "Mill Architecture," "Isochromatic Photography" and "Glimpses of the International Electrical Exhibition, are some of the best papers.

The American Meteorologist for July contains some very interesting reading. Among other paper we call attention to "Climate of Santa Fe" and "Weather Changes of long Period." The first by M. W. Harrington, the other by H. H. Clayton.

Other periodicals received are The Canadian Science Monthly for July; The Journal of Mycology, for July; The Gardiners Monthly and Horticulturist, for July; The Agassiz Association Journal, for July; The Practical Photographer, for July; The Library Journal, for July; The Co-operative Index to Periodicals (Quarterly), for May and June; Knowledge (R. A. Proctor, London), for June; The California Architect for July; La Moniteur du Commerce, for July; The Dial, a Monthly Journal of Current Literature, for July; The Auk, a Quarterly Journal of Ornithology, for July; The American Inventor, for July; The Manufacturer and Builder, for July; Scandinavia, for July; Mind in Nature, for July; The Woman's Magazine, for July; The Electrician and Electrical Engineer, for July; The Progressive Age, for July; Science (Weekly), for July; Le Technologiste, for June; The Virginias, for June; Clay, for June, &c.

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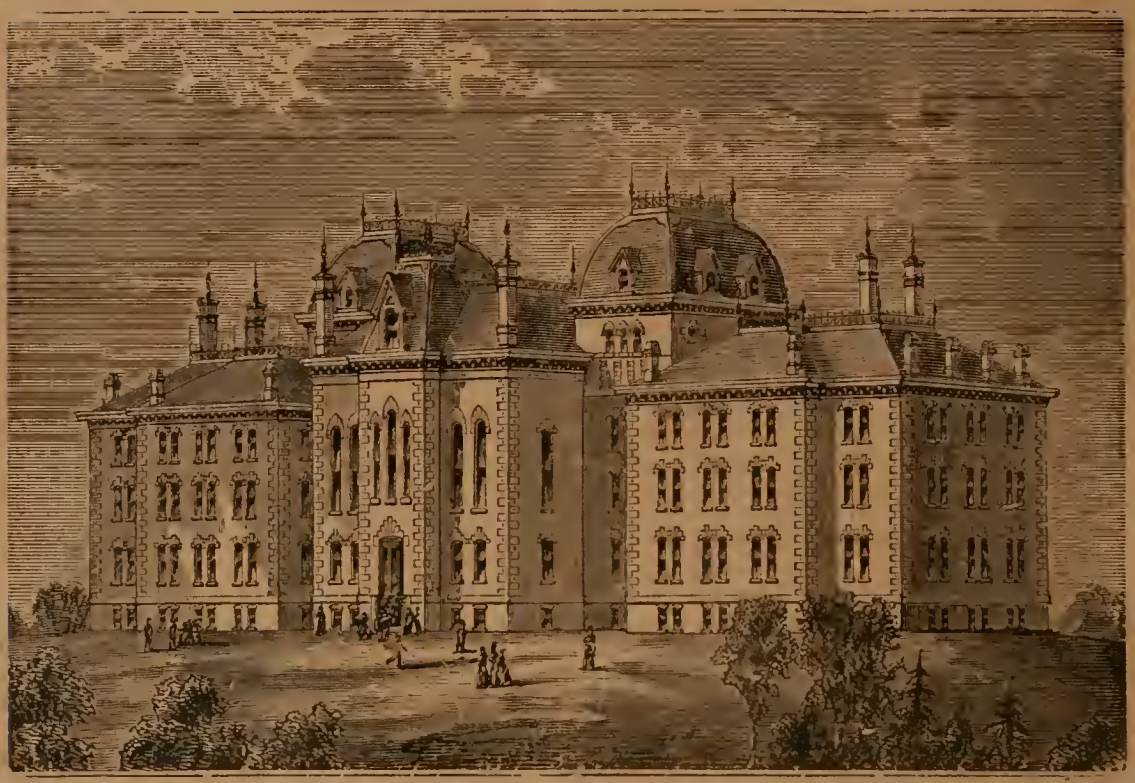

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